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U.S. Highway 93

Highway Traffic Collision Countermeasures

*On U.S. Highway 93 Corridor
FAP 5 Milepost 0 to Milepost 59.3*

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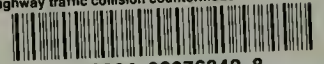
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Prepared by
Multi-disciplinary Traffic Safety Task Force
State of Montana
Helena, Montana 59620
January 1992

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Acknowledgements

This paper regarding a higher accident corridor represents a cooperative effort by the newly created multi-disciplinary traffic safety task force. The purpose of the team is to promote highway traffic safety issues. It is intended that the committee review, initiate, or implement highway safety projects or programs that are integrated together with surface transportation improvements as well as human behavior safety efforts. This team sincerely hopes this effort results in a transportation environment that promotes the well being of the people who travel Montana's streets and highways. As can be noted below, several state agencies as well as the Federal Highway Administration are represented on the team.

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HIGHWAY ACCIDENT COUNTERMEASURES ON U.S. HIGHWAY 93 CORRIDOR

I. Summary

The greatest number of rural transportation-related traffic accidents take place on a relatively small percentage of our roadways. Generally these large number of collisions occur on free-access, high-volume roadways that have traffic speeds of at least 40 miles an hour and are adjacent to an unusual amount of roadside development. Although the accident rates in Montana and nationally have significantly declined in the last 10 to 15 years, it is predicted that by early next century our national public highway system will experience 60,000 or more deaths as a result of increasing traffic volumes.

In an attempt to further reduce the accident rates on Montana's higher volume, higher speed arterial rural roadways, the newly created Montana Traffic Safety Task Force decided to research high accident corridors. The team recognized the benefits that last year's elderly corridor research project produced and believe further achievements can be derived by expanding this concept.

This year's project is to reduce traffic accidents on a corridor and to impact favorably the aging driver's needs. This effort applies an integrated approach to accident reduction countermeasures.

Research data showed U.S. 93 north of the City of Missoula to the City of Polson as having unusual amounts of traffic collisions and about 20% of those accidents involving older drivers (age 60+). A 60-mile corridor was selected for study and the task force attempted to identify improvements and programs to reduce the number of accidents along this roadway. Maps illustrating major highways in Montana and the study area follow on page six and seven, respectively.

This report also outlines five areas detailing recommendations regarding education, enforcement, licensing, engineering, and the safety team. Suggestions follow regarding traffic control improvements to the entire corridor and detail recommendations at ten accident concentration locations. We have public service announcements for the aging driver together with informational handouts concerning drivers vision, reactions, medication, alcohol and pedestrian safety. A driver's self assessment test was also adopted. The task force suggested that law enforcement agencies target their activities toward the following characteristics of accidents: 1) improper passing, 2) failure to drive to right, 3) use of seat belts, 4) no drivers license, and 5) had been drinking, etc. In conjunction with the above there is a discussion concerning the benefits of a team approach to highway safety matters.

It was found that communities along this corridor have very high percentages of older citizens. Lake County and the cities of Polson and Ronan are major communities central to the study corridor. In 1990, 26% of Polson and Ronan's population was over

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REIGN OF

CHARLES THE FIRST

BY

JOHN BURNET

OF

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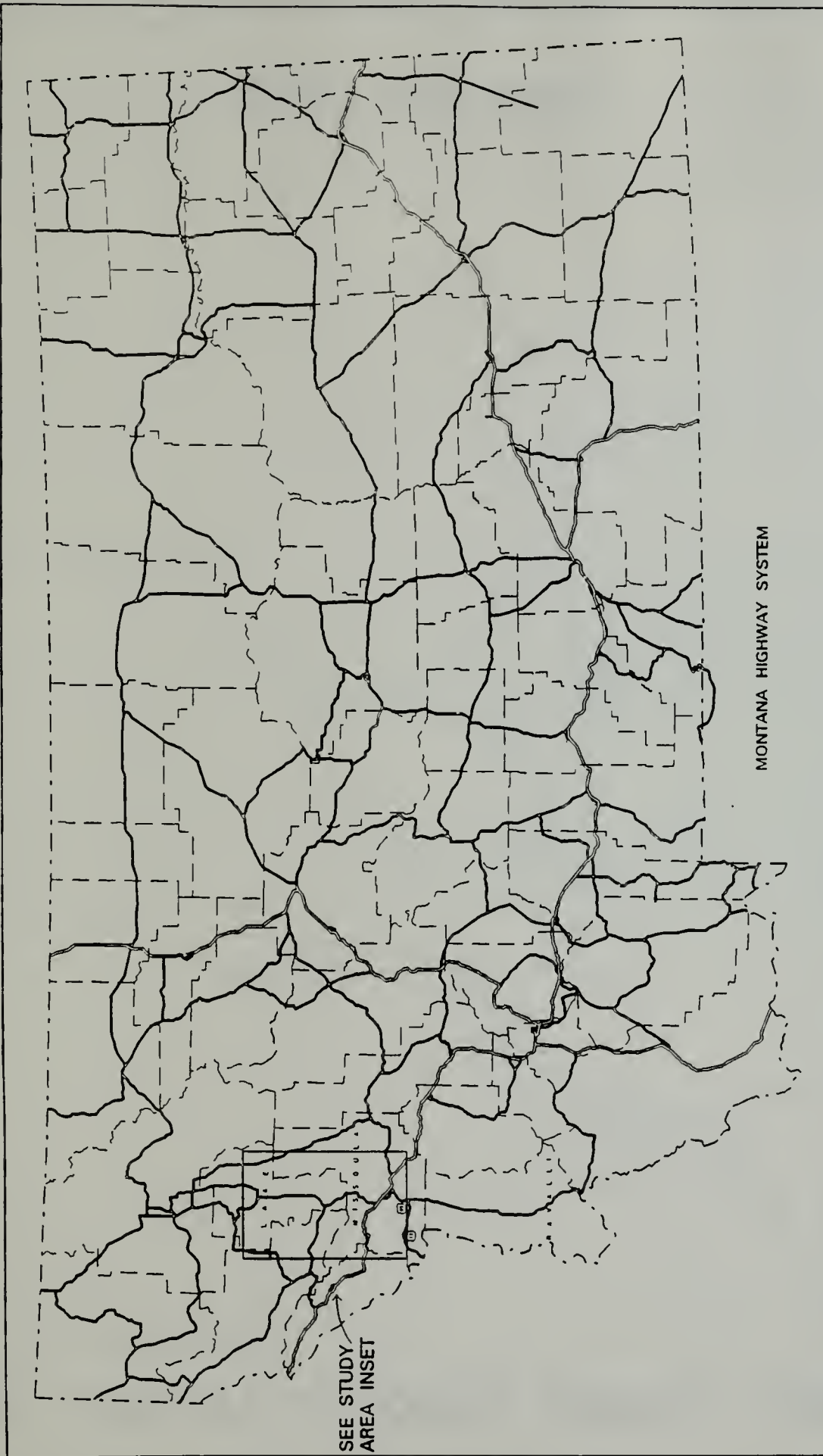
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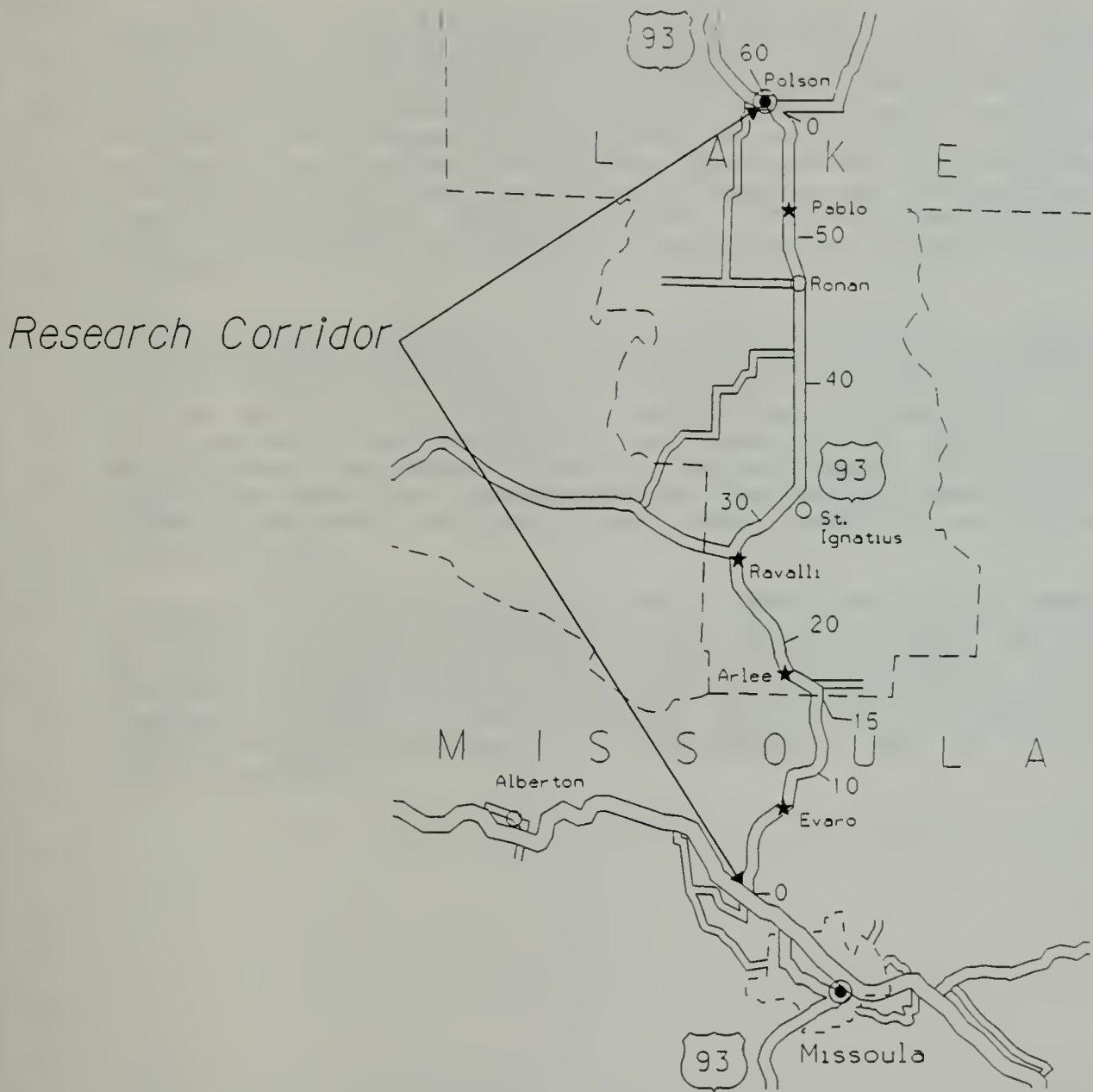
the age of 60, compared with approximately 17% for Montana and the rest of the nation.

We reviewed available literature regarding accident reduction issues and remedies. We looked for low and no cost countermeasures and improvements, particularly ones that could be implemented quickly. Overall we sought benefits for the entire driving population.

As of this date last year's Missoula South U.S. 93 Corridor Highway Safety Improvement Program is considered successful. However, full implementation of the recommendations will not be achieved until mid 1992. Both studies have generated cooperation by its interdisciplinary approach to solving highway safety problems. In addition to the involvement of various agencies, major support has come from local officials and we anticipate the same positive reaction from media members in areas adjacent to both corridors. We also anticipate increases in communication and cooperation as related to highway safety programs between federal and state agencies as well as local government.



Study Area Inset



LEGEND

- ★ - unincorporated cities
- - incorporated cities

U.S. 93 - MISSOULA TO POLSON RESEARCH CORRIDOR

II. Roadway Selection

The group reviewed all of the major highways of Montana. We searched thirty-mile roadway segments for accidents. U.S. Highway 93 stood out as having a large number of total as well as older driver accidents. We focused on a segment of this highway from Hamilton to just south of Missoula in 1990, and this paper contains research regarding U.S. 93 from just northwest of Missoula to Polson.

According to the thirty-mile segment analysis, U.S. Highway 93 from Darby to Missoula had the highest number of older driver traffic accidents in Montana. The above area was followed closely by U.S. 93 from Missoula to Polson. This paper relates to a corridor from milepost 0 to milepost 59 on F.A.P. 5 to analyze the accidents and the related roadway environment. There were 122 traffic accidents involving older drivers during the time period of January 1, 1987, to January 1, 1991. This was about 20% of the total 603 traffic accidents for this period along this highway segment.

Original Montana Highway Patrol accident reports were examined to create accident diagrams for the study segment of U.S. Highway 93. Several reports indicated that drivers had difficulty with conflict points, generally intersections and driveways. However, a variety of types and causes of traffic accidents were evident across the whole travel and commuting area. All accidents in this corridor showed drivers over represented or having problems with fixed objects, darkness, driveways, wet roads, weekends, and during the summer months.

In early 1990, Missoula County, and in 1988, Lake County, completed a traffic accident cluster area study and implemented improvements at about 30 locations on county roads. This included completing changes regarding signs, delineations and markings on county roadways adjacent to the two recent study areas. We believe this effort helped the aging driver's problems as well as the general driving public.

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III. Countermeasures and Improvements

Aging drivers are not a single homogeneous group nor definable solely by chronological age. Considerable individual differences in knowledge, skills and abilities exist within all age groups, at various ages and among various age cohorts. Programs designed for an aging driver must start, however, with a generalized profile and one probably ordered around two or more cohort groups, perhaps those aged 60 to 69, 70, and over.

Highway design and operations engineers commonly use a concept called the "85th percentile driver" as the standard when planning roadway construction and improvement. Not everyone agrees with the use of the "85th" percentage value. Some research suggests that highways be designed to accommodate a higher percentage of the motoring public such as the 95th, or perhaps the 99th percentile.

A higher percentage in the nineties may be warranted as the older drivers are more likely to be included in the upper percentiles. Highway design, construction and maintenance will need to keep pace with society's aging. Research also suggests that it may be desirable to undertake more intensive physical and social improvements in or near retirement communities to assist the older drivers.

Highway engineers are paying more attention to the special characteristics and capabilities of older drivers. Roadway designs and improvements to accommodate aging include:

1. creating traffic signs and signals of an appropriate size, graphically simple and clear as possible;
2. recognizing that aging may cause difficulty with certain colors and visibility which makes the use of color and reflectivity contrasts important;
3. making extensive use of advance warning and information signing;
4. using more readily visible delineation and markings for pedestrian crossings to help pedestrians and drivers;
5. narrowing the visual search area by careful placement of traffic signals; and,
6. simplifying intersections whenever possible.

According to researchers, delineation and sign visibility are two areas that can help the safety record of the elderly. There may be a need for wider edge lines, longer dashes, and a shorter strip-to-gap cycle. Other roadway delineators which could be used include painted and reflectorized guardrail and delineator posts. Increasing sign luminance together with good contrast and letter size promotes increased legibility. Some researchers feel highway signs and markings should be designed to work for all drivers, including those with poor vision and even those under the influence of alcohol or drugs.

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We propose addressing the needs of aging drivers using several approaches. These should be integrated into a program for accident prevention and reduction. The following four-part program and various countermeasures and improvements are proposed.

A. Multi-disciplinary Safety Team

The newly established safety team will periodically review and analyze, coordinate, and implement methods for lowering the number of accidents involving the general traveling public and aging drivers within this and other corridors. Members of the team include personnel from federal and state transportation departments and the Montana Department of Justice.

The mission of the team is, (1) to review the status of physical and social conditions affecting driving along accident-ridden corridors, and (2) to seek majority or consensual position on countermeasures and improvements to reduce roadway accidents. Data, information and research must be compiled prior to meetings in order to produce sound decisions regarding countermeasures and programs. The team has provided the opportunity to advance highway traffic safety throughout Montana.

Persons assigned to the team from state or federal agencies are authorized to commit their agency's resources at least to some level.

B. Public Education

Public information should be directed to the elderly and their associations as well as to the general driving public. More use of the media could be made to publicize specific highway traffic safety issues. Public agencies already provide significant amounts of information on accident types and causes as well as the roadways involving aging problems. New materials could target the aging driver and be distributed to all drivers at license renewal times.

Additionally, public information and education should be used in conjunction with law enforcement actions suggested in the next section. Warning the public, reminding them of specific enforcement actions and consequences, and keeping them apprised of the need and results of actions is warranted. An informed public will help to reduce injuries, fatalities and economic loss from highway traffic accidents. Too, an informed public is the best social and political force operating that may achieve desirable changes.

Recently produced public service announcements narrated by Chuck Yeager were received along with permission to use them in Montana. They cover issues of vision, safety belts, pedestrians, changing laws, and medication. The Appendix includes maps noting the media that may be used to reach the aging driver populations along the corridor. Contact and cooperation in developing and distribution applicable information and education should be sought with driver education specialists, associations of elderly, local county-city governments, and public interest groups. A listing of key contacts for the elderly is also included in the Appendix.

ORIGINAL ARTICLES

THE ANTHROPOLOGY OF THE
INDIAN ARCHipelago
By
J. H. R. KELLOGG

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In conjunction with the first working paper regarding this subject most of the public information, education and public service announcements directed towards the aging driver have been developed. See Appendix for details.

C. Enforcement

It is said people become creatures of habit, but some driving habits are too risky. Selective police enforcement warnings and citations should be issued at high accident locations and coupled with public education efforts. A speeding citation requires a driver to reconsider his or her personal safety behavior and to reduce the risks he or she takes when driving. Seat belt citations similarly remind drivers and passengers to save themselves and others.

We believe that firm signals must be sent to all drivers. Special enforcement of traffic laws should occur regularly on high accident roadways. Enforcing speed, safety restraint use, and anti-drinking and driving laws provides the best deterrence for most drivers to obey traffic laws. Safety spot checks by the Montana Highway Patrol for example, incorporate enforcement and education effectively.

Law enforcement officials are conscious of the negative impact of stops, warnings and citations. However, they also realize they perform as a "role model" for many youth and most adult drivers and consequently must follow the highest standards of driving safety and use of restraints. Laxity in enforcing traffic laws, therefore, sends a poor signal to the driving public and thwarts the effectiveness of existing or new countermeasures to help all drivers.

We recommend that the team or their representatives meet with all law enforcement agencies along the corridor to discuss the accidents, causes, results, recommended improvements and countermeasures. Sufficient time should be allowed to fully understand the issues, problems and needs that are amenable to improvement or beneficial change by law enforcement's awareness and actions. Information from this study and other material could be sent to the head of each law enforcement agency in advance of a meeting. This would inform law enforcement of the discussion to be held and alert them to the need for their participation. Based upon our accident data we found several law enforcement concerns directly relating to the collisions. These include the accident characteristics of 1) improper passing, 2) failing to drive to right, 3) seat belts not being used, 4) no drivers license and, 5) had been drinking, etc.

D. Licensing

Several things might be done in the area of testing and licensing of drivers. By enhancing the licensing screening procedures, and working with existing driving training programs, more drivers confronting aging would be reached than through sole reliance on general public information and education efforts. Use of self-tests, new visual and manual testing equipment, supplemental driving training and tests, would help drivers identify their difficulties due to aging.

Overall the intent is to reach drivers sooner than later. We must allow them to decide what their limits are and what to do about it at the same time they consider their needs for independence and mobility. A driver's license is not only a form of identification, it has to some become evidence of their competence and ability for many years. We found no "final" solutions in the research that magically waived an individual's or society's responsibility when deciding who drives when and how.

Included in the Appendix is a copy of a newly developed self-test. The Highway Traffic Safety Division has adopted and will use in helping all drivers understand the issues and the impacts of aging. Also, new technologies and procedures used in other states will be continually examined to find the most fitting changes to use in testing, licensing and processing of all drivers. And where changes are desirable, vigorous efforts should be made to find the resources to finance these improvements.

E. Engineering

Several areas of the roadway environment need to be addressed. These include highway signs, roadway markings, and intersection design. Following are specific illustrations and recommendations.

1. U.S. Highway 93 Corridor - General Recommendations

We recommend that all four-inch-wide pavement markings be increased to six-inch markings, from north of the City of Missoula to just south of Polson. Principally this involves increasing edge line markings. However, we recommend the centerline also to be considered.

A total review of the adequacy of all signs and their supports along the corridor is recommended as most should be replaced at this time. Three major reasons for this recommendation are: (1) many traffic control signs need adjustment in their placement, (2) The average age of these signs is a concern and, (3) Many sign supports are installed incorrectly or in recent years received poor maintenance. We recommend higher reflectivity sign sheeting for this corridor with contrast techniques applied to major guide signs. This may require a combination of engineering grade and high-intensity sign sheeting. As a result of research larger signs and letters are also recommended. Current information revealed volume increases of approximately 4 percent per year. The roadside post-mounted delineation appears questionable, about 40 percent are missing, soiled, old or misplaced. These should be reviewed and upgraded.

The first part of the paper discusses the importance of the research and the objectives of the study. It highlights the need for a comprehensive understanding of the current state of the field and the potential for future advancements. The second part of the paper presents the methodology used in the study, including the data collection methods and the analytical techniques employed. The results of the study are then presented in detail, showing the findings of the research and the implications for the field. Finally, the paper concludes with a summary of the key findings and a discussion of the limitations of the study and the potential for future research.

The research was conducted using a combination of qualitative and quantitative methods. Data was collected from a series of interviews with experts in the field, as well as from a review of the literature. The data was then analyzed using a series of statistical tests to identify patterns and trends. The results of the study show that there is a clear need for a more integrated approach to the study of the field, and that there is a significant potential for future advancements in the field.

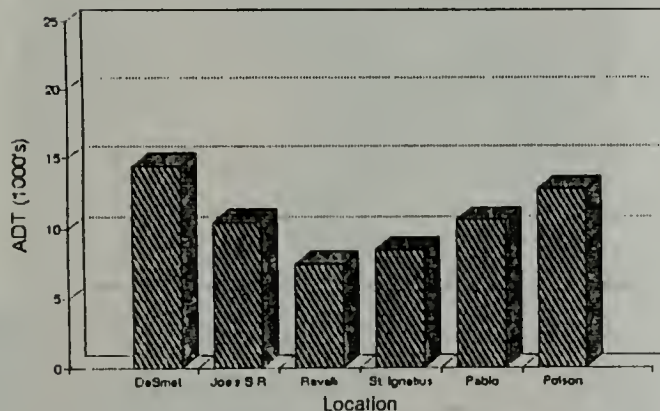
The findings of the study have several implications for the field. First, they suggest that there is a need for a more integrated approach to the study of the field, one that takes into account both the qualitative and quantitative aspects of the field. Second, they suggest that there is a significant potential for future advancements in the field, and that these advancements will likely come from a more integrated approach to the study of the field. Finally, they suggest that there is a need for further research in the field, and that this research should focus on the development of a more integrated approach to the study of the field.

In conclusion, the research presented in this paper has several important implications for the field. It highlights the need for a more integrated approach to the study of the field, and it suggests that there is a significant potential for future advancements in the field. The findings of the study also suggest that there is a need for further research in the field, and that this research should focus on the development of a more integrated approach to the study of the field.

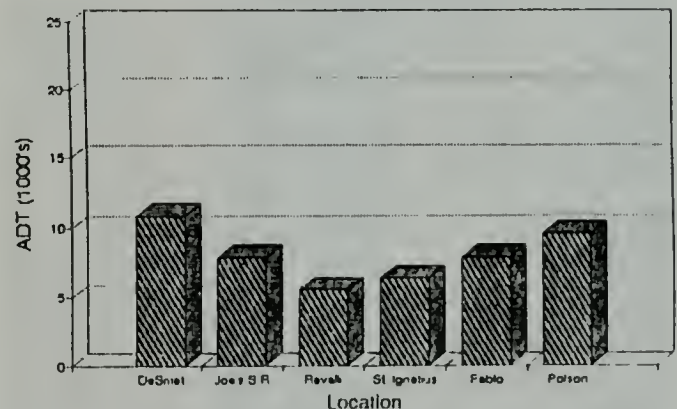
Mailbox supports along this corridor are in very poor condition and few would break-away correctly if hit by a vehicle. However, the Montana Department of Transportation together with the U.S. Postal Service are working to solve this problem. The inconsistent application of post mounted delineators, poorly maintained signs, and sign supports appears to be a matter which deserves further review by state maintenance personnel. Other matters of concern relate to current approach permit policies and the level of existing maintenance of the majority of the traffic control devices on U.S. 93. Further explanation and examples of these concerns follow in this report.

The major focal point of this paper basically relates to the number of reported traffic accidents in general and we targeted our efforts towards the aging driver in detail. However, further concerns directly relate to existing and projected traffic volumes on this corridor. The following graphs illustrate why we feel additional emphasis should be placed on quickly providing improved traffic control devices along U.S. 93. Other justification relates to the fact that several reconstruction projects are scheduled for 1995 or 1996 ready dates but it is more realistic to assume that actual construction will not take place in the near future.

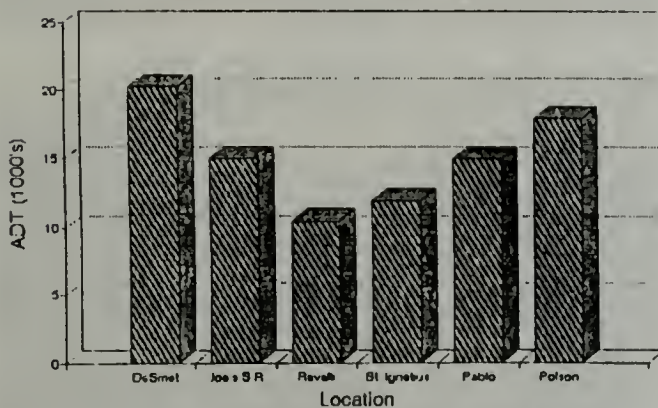
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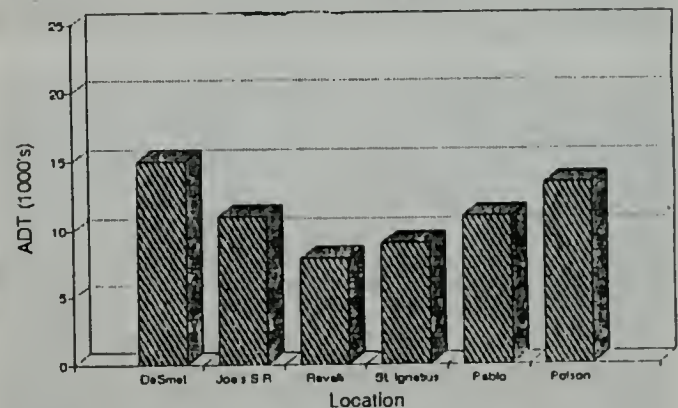
1991 AADT



2000 Summer ADT



2000 AADT



Illustrations and recommendations on specific sites along the corridor follow. These examples of the problems and identification of solutions offer more opportunity for understanding and follow-up by persons best able to complete these improvements. They are not exhaustive of the problems noticed but are indicators of the need to conduct a more thorough inventory and improvement schedule.

2. The first part of the paper discusses the importance of the study and the objectives of the research. It also provides a brief overview of the methodology used in the study.

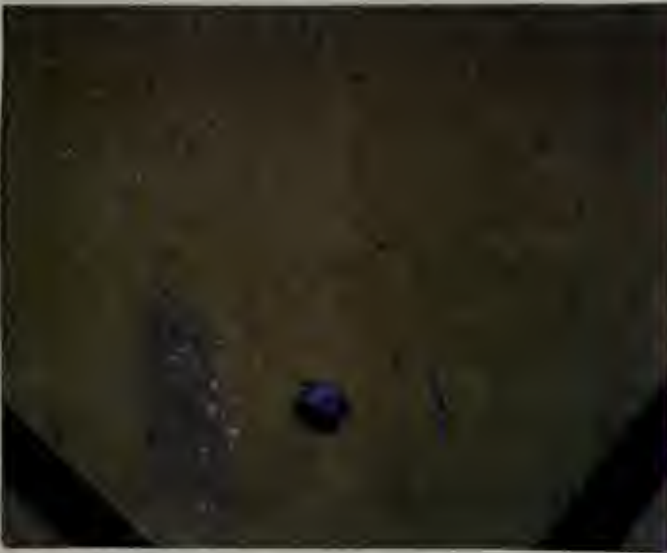
The second part of the paper presents the results of the study. It includes a detailed description of the data collected and the analysis performed. The results are presented in a clear and concise manner, with appropriate use of tables and figures.

The third part of the paper discusses the implications of the study. It highlights the key findings and their significance for the field of research. It also provides a critical evaluation of the study and its limitations.

The fourth part of the paper concludes the study. It summarizes the main points and provides a final statement on the importance of the research. It also includes a list of references and a bibliography.

The paper is written in a clear and concise manner, with appropriate use of technical language. It is well-structured and easy to read, making it a valuable resource for researchers in the field.

Below Find Examples of Safety Features on U.S. 93



Some signs appear weathered with poor night reflectivity



Weathered sign



Sign hit and reused



Poor sign support maintenance



Incorrect sign support



Incorrect sign support and mounting height



Missing stop sign



Non-yielding mailbox support



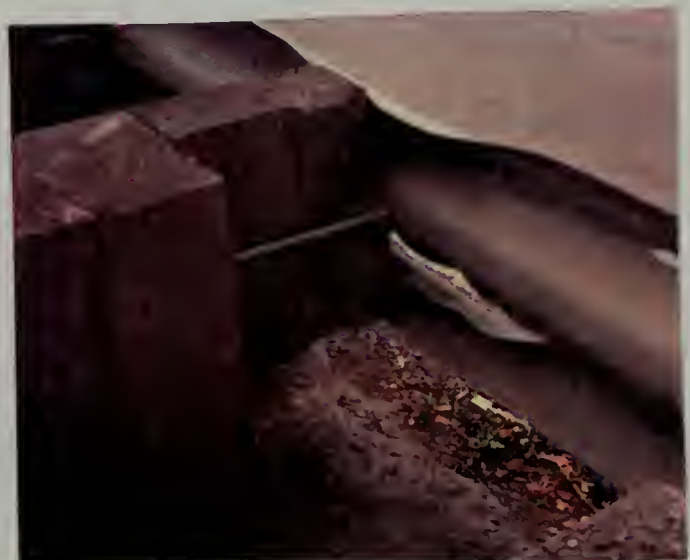
Non-yielding mailbox support



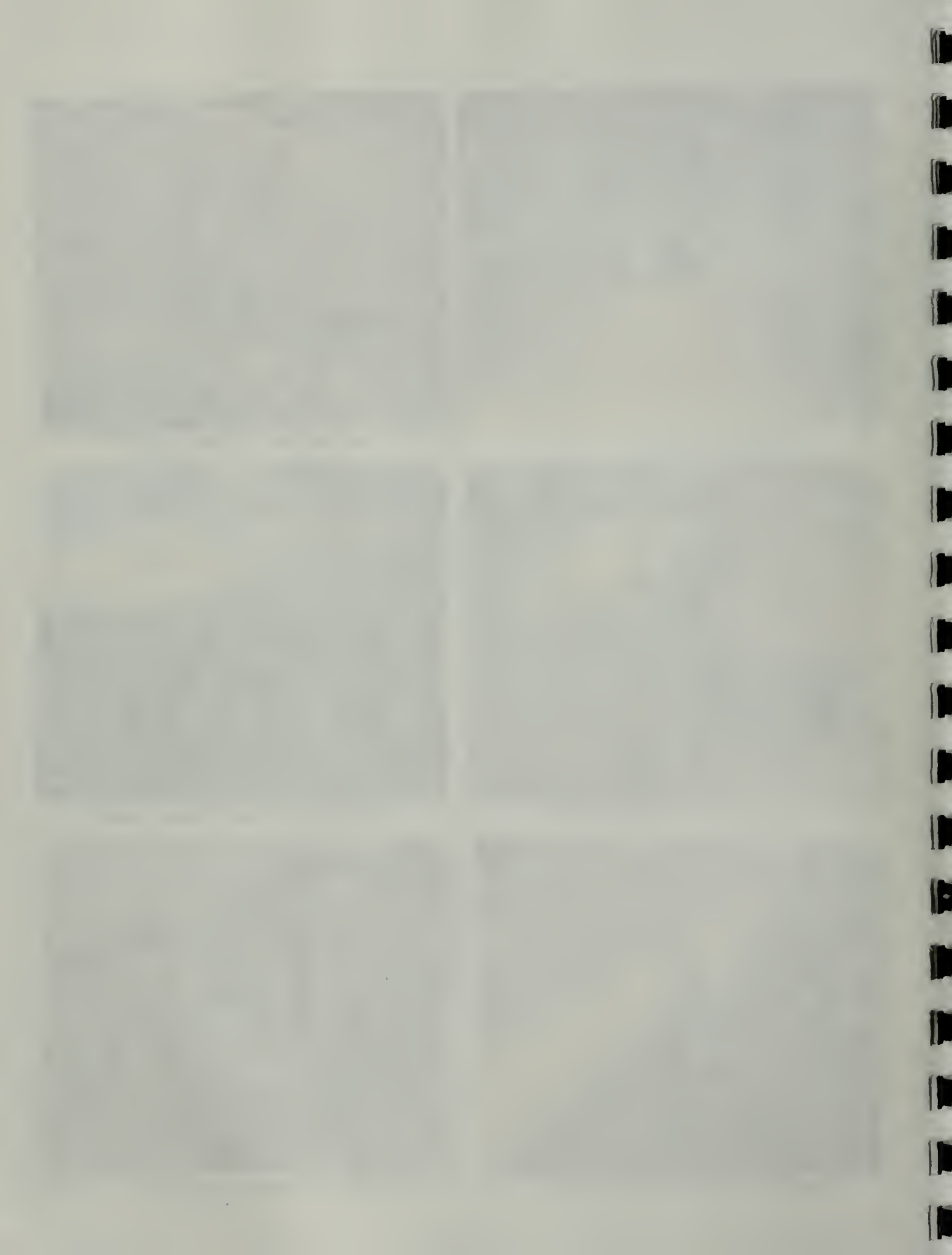
Questionable maintenance patch



Guardrail maintenance problems



Guardrail maintenance problem



2. Accident Concentration Areas

The US 93 corridor accident information revealed ten locations of particular concern. These following locations experienced clustering of traffic collisions during the time period of January, 1987 to May, 1991.

- a. Desmet Interchange M.P. 0 to M.P. 0.5 (34 Accidents)
- b. Approximately 3 miles North of the Desmet Interchange
M.P. 3.2 to M.P. 4.3
(25 accidents)
- c. Joes Smoke Ring M.P. 9.6 to M.P. 10.6
(26 accidents)
- d. Between Evaro and Arlee M.P. 12.7 to M.P. 13.7
(29 accidents)
- e. Just South of Arlee and including the intersection of FAS
559 with U.S. 93 M.P. 15.9 to M.P. 16.9
(30 accidents)
- f. North and South of Ravalli M.P. 25.5 to M.P. 28.5
(47 accidents)
- g. North and South of St. Ignatius M.P. 32.2 to M.P. 33.0
(21 accidents)
- h. North of Ronan at Mud Creek Road M.P. 50.1
(11 accidents)
- i. Pablo at Division St. M.P. 51.9
(8 accidents)
- j. Just South of Polson including the intersection of
U.S. 93 with Mt. 35 M.P. 58.9 to M.P. 59.3
(14 accidents)

A field review of the above locations revealed the following:

a. Desmet Interchange North

As a result of a current highway construction project (IR 90-2 (80) 96) this area is being completely redesigned. Construction should be completed in the next two (2) years. It is believed that the completed project will help satisfy the needs of the older drivers and the general public. In conjunction with this project we believe that serious consideration should be given to extending the roadway lighting or luminaires north to include the intersection of U.S. 93 with Cartage Road. Some 70 percent of the traffic accidents north of the interchange are angle type collision at the Conoco Truck Stop approach. If possible and time allows consideration should be given to providing traffic control measures to reduce the likelihood of these collisions. This may include a northbound right-turn lane for the truck stop.



Looking south at Truck Stop Intersection



Looking North at Truck Stop Intersection

b. Approximately Three (3) miles North of the Desmet Interchange

A study of the traffic accidents in this area revealed two (2) distinctive trends. The first being an unusual number of animal related traffic accidents (30%) and also a high percentage of run-off-the road collisions (50%). As a result of the deer related accidents we believe consideration should be given to trimming the brush and trees along this site back to the right-of-way line. Also deer crossing signs (MUTCD W11-3) located for northbound traffic at M.P. 3.3 and Southbound traffic at M.P. 3.8 should be considered. Another item which may apply relates to deer delineation. The problem should be addressed with the application of less than one (1) mile of this type of delineators.

The run-off-road accidents occur mostly in the northbound direction (85%) and during snowy or icy road conditions (70%). We believe some of the problems relate to the fact that this area, northbound, is the first major curve for approximately three (3) miles. Also this is the beginning of an uphill grade with hills on both sides of the roadway. The removal of the roadside brush should help open the road to sunlight and thereby have a tendency to clear the ice and snow from the road surface. However, we believe further winter maintenance activity is also justified. This location should receive a higher than normal plowing and sanding priority than the typical area along this corridor.

The outside southbound lane in this area received a recent maintenance patch which only included one-half of the lane. Current information indicates that this is a questionable maintenance practice. Differing friction factors from the two road surfaces can cause yawing of the vehicle in inclement weather.





Looking North on U.S. 93



Looking South on U.S. 93

c. Joes Smoke Ring M.P. 9.6 to M.P. 10.6

About 40 percent of the traffic accidents at this location are intersection related. Therefore we studied the accidents at two (2) approaches for Joes Smoke Ring. The store, service station, rodeo grounds and entertainment center at this location generates a significant amount of traffic. The special summer events generate traffic demands that overflows the parking area on the west side of the highway. As a result of this demand parking on the east side of the road is common. The owner of Joes Smoke Ring has indicated that future plans are to open 20 acres on the eastside of the road for parking. Based upon current traffic demands, projected volumes and future expansion plans by Joes Smoke Ring we believe justification exists to consider a northbound left-turn bay. The major volume approach is located on the south side of the service station or gas pumps. Because this approach is only about 800 feet north of a bridge we believe the left-turn bay should only be considered for the north approach. The south approach is currently about 150 feet wide. This approach should be reduced in width to 30 feet and only provide right turning maneuvers in and out. Based upon the existing and projected night pedestrian movements across U.S. 93 we also believe justification exists for possibly installing highway lighting.



South Intersection



Looking south at North approach

d. Between Evaro and Arlee

The majority of the traffic accidents in this area involve vehicles leaving the roadway. We believe the reason relates to the fact that little or no paved shoulder exists on this three (3) lane roadway. The paved shoulders were used in order to gain the appropriate pavement width to add a southbound passing lane. About one-half the accidents were at night, dawn or dusk and several of the day time accidents were during low visibility weather conditions such as heavy rain or snow. As a result of the above we believe justification exists to double space or oversize the delineation together with flexible posts on this site. Other concerns relate to vehicles pitching and rolling after they leave the roadway. Many of the accidents involve vehicles hitting steep approach slopes along this roadway. We believe the Montana Department of Transportation should emphasize their inspection policy regarding approaches. The following photos illustrate the typical roadway shoulder and approach in this area.



Looking North



Looking South

e. Just South of Arlee

This site also has little or no shoulders and the pavement is only 28 feet wide. This condition appears to directly correlate with the fact that about 60 percent of the accidents involve vehicles leaving the roadway. We believe justification exists to double or oversize the delineation together with flexible supports similar to the above site. The inconsistent application of approach delineators should also be reviewed in this area as well as the entire corridor.

The Jocko Valley Information sign and pullout exists at M.P. 15.9. There are two (2) similar information pullouts along this corridor. Further review into possibly incorporating this information into the newly constructed information center located just north of Ravalli is recommended. This could eliminate three (3) significant conflict points on this roadway.



Looking North



Looking South

f. North and South of Ravalli

The major area of concern within this site relates to a curve at M.P. 25.5. This curve is the first northbound curve after a long tangent section of roadway. All of the traffic accidents involve a driver northbound and 50 percent of them during icy road conditions. Currently both advance warning and chevron curve signs exist. We believe High-Intensity sign sheeting and oversized signs are warranted in the northbound direction. Additional winter maintenance activity also appears to be justifiable.



Westside



Looking North



Eastside

g. North and South of St. Ignatius

The three (3) approaches to St. Ignatius are within this site. Both the north and south approach do not show serious historical traffic accident problems. However, the center approach to St. Ignatius and Alerds stores indicate a accident trend with southbound traffic. Eighty five percent of the accidents involve a southbound vehicle resulting in turning movement, right-angle, and rear-end collisions. We believe an oversized southbound

intersection ahead sign should be added to this intersection. Also luminaires exist for both the north and south intersections at this site. For consistency, perhaps this treatment should be extended to include the center intersection since this location has the highest volume side street approach traffic. However, the center approach has not experienced an unusual number of night traffic accidents.



Looking West on Center
Intersection



Looking South at Center
Intersection

h. Just North of Ronan At Mud Creek Road

After a field and office review of the data and information relating to this location we do not recommend any traffic control changes at this time. The side street traffic volumes are very low and the historical traffic accident experience does not show a detectable trend.

i. Pablo at Division St.

About 50 percent of the traffic accidents at this location are angle type collisions. The severity is very high as a result of existing U.S. 93 approach speeds and vehicle volumes. The construction of a new convenience store and service station on the east approach to this intersection together with the fact that the west approach provides the major access to the community of Pablo seems to create a condition which develops significant side street approach volumes. Our spot check of traffic volumes revealed U.S. 93 currently is experiencing AADT of just less than 8,000 and an almost equal side street approach AADT of just over 1,000. However, summer peaks in volumes show an estimated 10,600 and 1,500 ADT for U.S. 93 and the major side street approach traffic respectively. Based upon the existing traffic volumes, projected volumes, summer-winter volume variations and traffic accident history, we believe justification exists to consider further traffic control measures. At this time perhaps the approach streets should be considered for additional lanes separating the right, through, and left turning movements. With the existing high speed U.S. 93 approach vehicles perhaps better intersection distinction can be accomplished by the application of an overhead

flasher. Well placed oversized post mounted delineations should be considered as a minimum.



Looking West



Looking East



Looking North

j. South City Limits of Polson Includes the Intersection of U.S. 93 and MT 35

Even though this site is considered a accident cluster area the accident rate is low. The only two (2) areas of concern relate to the commercial development located in the northeast corner of the intersection of U.S. 93 with Mt. 35 and the discount shopping center approach. About 35% of the accidents at Mt. 35 related to the wide-open uncontrolled access to the establishments and parking practices. Another 30% of the accidents were directly related to the discount shopping center approach. Both circumstances will require major geometric changes to correct existing conditions. We believe they can best be treated in conjunction with the scheduled reconstruction project.



Looking North



Looking South

In summary, the US 93 roadway environment is one of several areas that can be improved to enhance the driving performance of the elderly. Most of the suggested improvements are incremental changes or modifications to existing roadway features or design procedures. Providing signs that are easier to read at greater distances; using multiple signing; properly maintaining existing pavement markings and signs; using simpler intersection configurations; removing, reducing, or improving conflicting intersection movements are examples of some of the countermeasures which we believe will particularly benefit the older driver as well as the entire driving public.



IV. Appendices

Appendix A

Public Information Material, Key Contacts

TELEVISION

PENETRATION

Study Area Inset

Kalispell/Missoula

Research Corridor

Television coverage into the study area is a fairly simple task to accomplish.

One (1) Missoula station;

KPAX TV

would be used, as their signal off-air and CATV goes into the area.

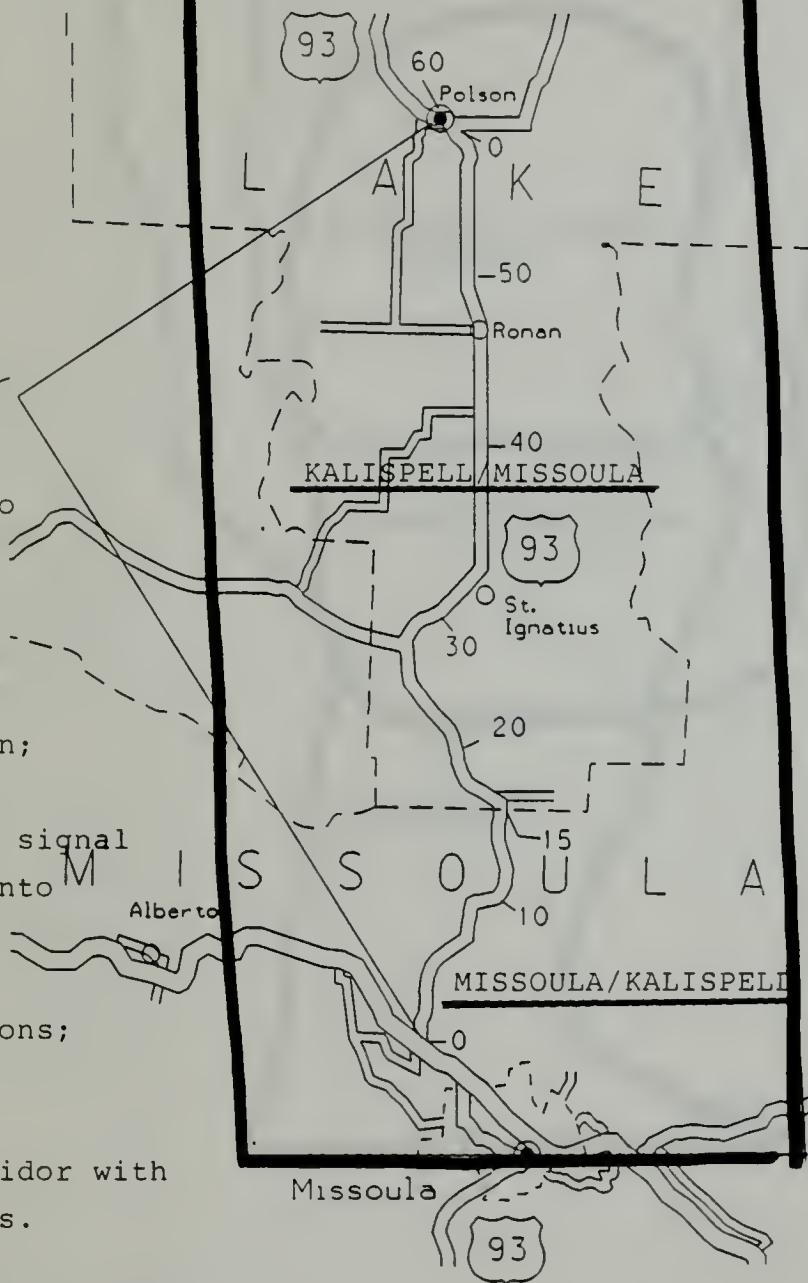
Two (2) Kalispell stations;

KECI TV and

KCFW TV

both penetrate the corridor with off-air and CATV signals.

Use of all three mentioned would be the most advantageous way to cover the target audience.



U.S. 93 - MISSOULA TO POLSON RESEARCH CORRIDOR



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RADIO
PENETRATION

Study Area Inset

Research Corridor

Radio penetration into the study area requires a diverse placement of PSA's in order to properly and fully reach the target audience.

Two (2) Missoula stations:

KYSS-FM and
KGVO-AM

cover from the South.

In Polson;

KERR-AM and
KQRK-FM

cover all directions.

In Kalispell;

KOFI-AM & FM
KJJR AM & FM

both penetrate into the corridor.

It is recommended that all of the above mentioned stations be utilized to reach the audience.

U.S. 93 - MISSOULA TO POLSON RESEARCH CORRIDOR





CONTACTS FOR SENIOR TRAFFIC SAFETY PROJECT
ALONG P 5

Governor's Office on Aging -- Brian LaMoure, ph. 444-3111

Susan Kolar Herd -- Missoula area ph. 728-7682

Duane Lipke -- Polson and Bitterroot area ph. 883-6211 x288 or 289

Area Contacts:

- 1) Mission Valley Senior Center
528 Main St. S.W.
Ronan, MT 59864
Administrator: Jiggs Lentz
Phone: (406) 676-2371
- 2) Polson Senior Citizens Inc.
504 3rd Ave. E., Box 2243
Polson, MT 59860
Administrator: Clarice McAllister
Phone: (406) 883-4735
(406) 675-8066 After Hours
- 3) St. Ignatius Senior Citizens Center
P.O. Box 359
St. Ignatius, MT 59865
Administrator: Ruth Krantz
Phone: (406) 745-4462
(406) 745-4472 After Hours
- 4) Elder Indian Program
P.O. Box 329
St. Ignatius, MT 59865
Program Manager: Arlene Templer
Phone: (406) 745-4115

Contacted Reba Fox, Missoula ph. 721-2008 who is the coordinator for AARP 55 Alive courses in the areas surrounding Missoula, which includes our study area. She said they are running more than one course a month in Missoula.

THE JOURNAL OF THE ROYAL ANTHROPOLOGICAL INSTITUTE

VOL. LXXII. PART I. 1942.

CONTENTS.

THE JOURNAL OF THE ROYAL ANTHROPOLOGICAL INSTITUTE, VOL. LXXII. PART I. 1942.

THE JOURNAL

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Appendix B

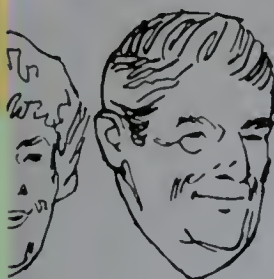
Self-Test Material, Helpful Hints and Handouts
(See Attachment)

Driving Tips for the Mature Driver

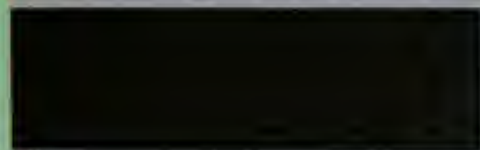
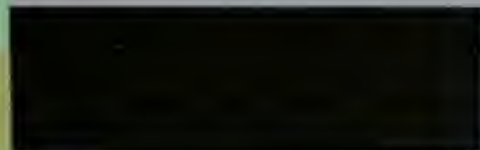
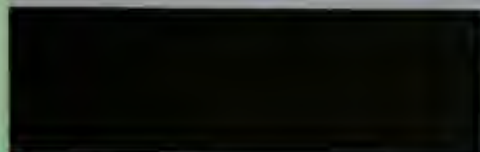


PEDESTRIAN SAFETY

DRIVERS 55 PLUS:



N PERFORMANCE



A Self-Rating Form of
Questions, Facts and Suggestions
for Safe Driving

by

James L. Malfetti, Ed.D.
Darlene J. Winter, Ph.D.

Safety Research and Education Project
Teachers College, Columbia University
and

AAA Foundation for Traffic Safety
1730 M St. N.W., Suite 401
Washington, D.C. 20036

Avoid driving in unfamiliar areas, night driving, peak traffic times, bad weather and situations you know you will be uncomfortable with.

Avoid situations that require backing up.

Many of these problems can be dealt with through older-drivers refresher courses. Your AARP representatives or AAA offices can inform you where courses are available. Or you can contact the office listed below.

For more information, contact:

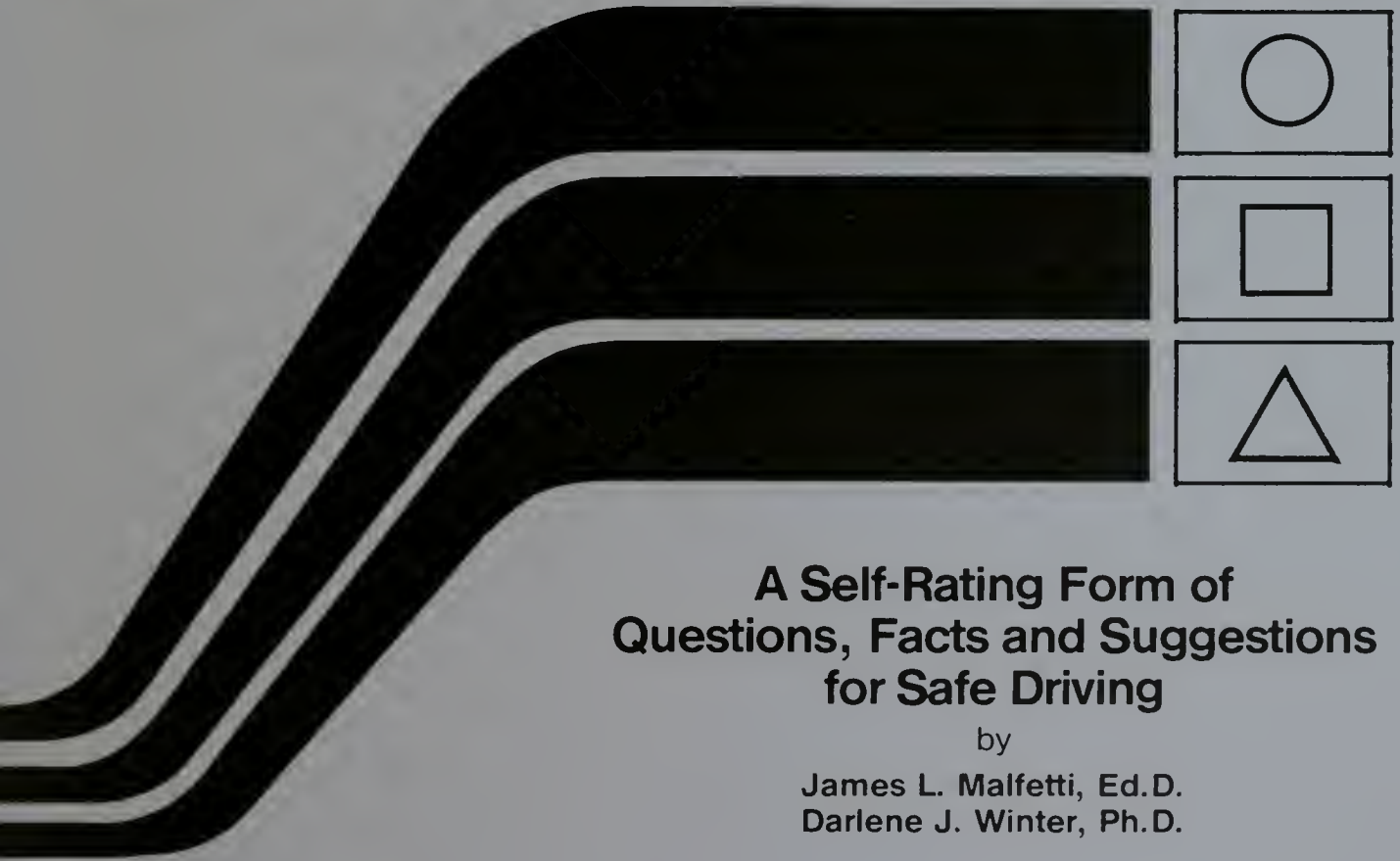
Highway Traffic Safety Division
Department of Justice
303 N. Roberts
Helena, MT 59620
444-3412

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DRIVERS 55 PLUS:

TEST YOUR OWN PERFORMANCE



A Self-Rating Form of Questions, Facts and Suggestions for Safe Driving

by

James L. Malfetti, Ed.D.

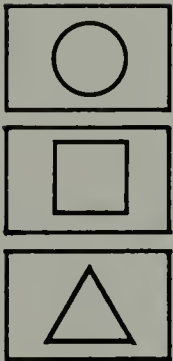
Darlene J. Winter, Ph.D.

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TEST YOUR OWN PERFORMANCE

By the year 2,000, one of every three drivers in America will be over 55 years of age. Freedom to travel by automobile—the way they prefer—will continue to be an important factor in their independence and mental health.

Almost everyone seriously concerned with traffic safety wants to keep older drivers on the highways as long as they can drive safely. Age should never be mistaken as the sole indicator of driving ability. In fact, drivers over 55 represent a wide range of ability, and no individual should have a license jeopardized solely because of age.

However, there is convincing evidence that the skills necessary for safe driving begin to deteriorate at age 55 or thereabouts, perhaps dramatically so after 75. There is also much evidence that aging drivers can cope safely with this decline. Toward that end it is important that they recognize their limitations and unsafe practices, and be aware of remedial actions—and that is the purpose of the older driver self-rating package.

The rating form on the next page is for your use alone. After answering the 15 questions, you will compute your own score and be advised of what it means. In a detailed explanation that follows the interpretation of your score, you will be informed about what measures you should take to cope with any of the deficiencies revealed; or you will be helped to understand when remedial measures may no longer be possible. *The central idea is to help you drive as long as possible with safety to yourself and others.*

Now, please turn to the next page and follow *Instructions*.

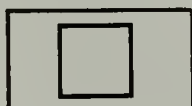


DRIVERS 55 PLUS:

INSTRUCTIONS: For each of the following 15 questions, check the symbol for the **one** answer that most applies to you.

	Always or Almost Always	Sometimes	Never or Almost Never
1. I signal and check to the rear when I change lanes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I wear a seat belt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I try to stay informed on changes in driving and highway regulations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Intersections bother me because there is so much to watch for from all directions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I find it difficult to decide when to join traffic on a busy interstate highway.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I think I am slower than I used to be in reacting to dangerous driving situations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. When I am really upset I show it in my driving.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. My thoughts wander when I am driving	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Traffic situations make me angry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I get regular eye checks to keep my vision at its sharpest.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I check with my doctor about the effects of my medications on driving ability (If you do not take any medication, check this box <input type="checkbox"/> and skip this question.). ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. I try to stay abreast of current information on health practices and habits.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. My children, other family members or friends are concerned about my driving ability.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>Note new headings → None One or Two Three or More</p>			
14. How many traffic tickets, warnings or "discussions" with officers have you had in the past two years?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. How many accidents have you had during the past two years?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

SELF SCORING: Count the number of check marks in the ☐ and record the total in the ☐ below. Follow the same procedure for the ☐ and ☐.



These are your Check Mark Totals.
For score and interpretation, see next page.

SELF-RATING FORM

SCORING: There are 4 steps:

Step 1: Write your ☐ and ☐ Check Mark Totals from the previous page in the same symbol to the right.

Step 2: Multiply the number in the ☐ by 5.

Step 3: Multiply the number in the ☐ by 3.




Step 4: Add the results of Steps 2 and 3.

$$\bigcirc \times 5 = \underline{\hspace{2cm}}$$

$$\square \times 3 = \underline{\hspace{2cm}}$$

YOUR SCORE IS

Interpretation of Score: The **higher** the score, the more the danger to yourself and others.

SCORE	MEANING
35 and over 	STOP! You are engaging in too many unsafe driving practices, and are a potential or actual hazard to yourself and others. Examine the questions you checked <input type="radio"/> or <input type="checkbox"/> . Ask yourself how or if these conditions can be corrected, and what action you will take.
16 to 34 	CAUTION! You are engaging in some practices which need improvement to ensure safety. See the <input type="radio"/> or <input type="checkbox"/> symbols you checked for areas requiring change.
15 and below 	GO! You are aware of what is important to safe driving, and are practicing what you know. Nevertheless see what <input type="radio"/> or <input type="checkbox"/> symbols you checked. They are areas in which even you might improve your driving practices.

These scores are based on what you and other drivers 55 and over have told us about driving practices and habits as well as on research studies of older driver problems and needs. Your score is based on your answers to a necessarily limited group of important questions. For a complete evaluation of your driving ability, many more questions would be required, along with medical, physical and licensing examinations. Nevertheless your answers and score give some indication of how well you are doing, and of what should be done to improve things.

In general, a checked ☐ for an item reflects an unsafe practice or situation that should be changed immediately. A checked ☐ means a practice or situation that is unsafe, or on it way to becoming so, if nothing is done to improve it. ☐ is a sign that you are doing what you should be doing to be (and remain) a safe driver.

Most of the ☐ and ☐ answers represent practices or situations that can be improved by most drivers. The following pages discuss the various questions on the self-rating form you have completed. After a general introduction, the discussion is divided into five areas which traffic safety authorities have judged critical to safe performance—*driving habits, physical condition, emotions, health habits, driving records and other indicators*. As the discussion moves through these categories, you may wish to focus on what applies to the ☐ and ☐ symbols you checked.

The discussion is organized around why an item is important (**FACTS**), and what, if anything, can be done to overcome shortcomings (**SUGGESTIONS**), so that you can maintain safe driving performance, or improve it.



DRIVERS 55 PLUS: DISCUSSION OF ANSWERS

INTRODUCTION

Driving involves starting a motor vehicle, joining traffic, operating it safely with minimum disturbance to other drivers, leaving traffic, stopping and getting out. A driver must perform a series of coordinated tasks with hands, feet, eyes, ears, and body movements, while making decisions about what he or she sees, hears and feels in relation to other cars and drivers, traffic signs and signals, conditions of the highway and the performance of the car. These decisions, usually made in close proximity to other vehicles, must be converted into braking, steering, accelerating or some combination to maintain or adjust one's position in traffic. And these decisions must be made frequently and quickly. About 20 major decisions are necessary for each mile driven, and drivers frequently have less than one-half second to take action or suffer an accident.

The record of older drivers is good when one counts accidents per driver, but bad when one counts the number of accidents per mile driven. Older drivers have fewer accidents because they drive less, and at less dangerous times. But when they have an accident, it can be very serious. In a two-car fatal crash, where one driver is 65 or older, the older driver is 3.5 times more likely to be killed.

What is responsible for the higher accident rate and fatality rate per accident of older drivers? Probably aging and the normal decline of the skills needed for safe driving. We do not see or hear as well, or react as quickly as when we were younger. And, for some of us, age-related illnesses such as glaucoma or arthritis are additional debilitating factors. Moreover when we are injured, we do not heal as quickly as when we were younger. What is moderate to serious injury for a younger person may be fatal for us.

However, there are actions we can take to stay

safely on the road, and these will be discussed as you review your answers to the 15 self-rating questions. Discussion is organized about why a question is important (**FACTS**) and what can be done to improve your driving performance (**SUGGESTIONS**).

As we age, some of us try to deny we are beginning to lose the skills needed for safe driving, pretending that we see better or act more quickly than we do, yet a decline may be obvious to others. Or we can identify and respect our age-related shortcomings, and cope with them by taking constructive actions. We are urging the latter, and providing **SUGGESTIONS** toward that end—simply because for all of us, there will come a day when we can no longer drive safely. We hope **FACTS** and **SUGGESTIONS** will assist in planning for that day and recognizing it when it arrives.

The discussion which follows is presented in five categories of three items each: Driving Habits (Items 1-3); Physical Conditions (4-6); Emotions (7-9); Health Habits (10-12); Driving Records and Other Indicators (13-15).

DRIVING HABITS (Questions 1-3)

Driving habits are everyday driving practices—from starting the car and joining traffic to leaving traffic and parking. Those habits either place us at higher risk or reduce the chance of accident.

1. I signal and check to the rear when I change lanes.

Even those of you who checked a ☐ answer probably know that “*always*” is not only the best but also the only acceptable answer. However, what we know and what we do can be two different things. Good driving includes checking the rear view mirrors, looking to the rear to cover the “blind spots,” and signaling before changing lanes.

FACT: Records indicate that one of the specific unsafe driving habits of older drivers is failing to look to the rear. In observational studies, older drivers report being unaware of having failed to look to the rear before changing lanes or backing up. The fact that some do not recognize that they engage in this dangerous habit might be due to gradual changes in driving behavior to compensate for chronic stiffness and/or pain in the neck and upper body due to arthritis. Older drivers may not be aware of how careless they have become because of the pain and difficulty of turning around to see to the rear. Furthermore they may lack knowledge of the importance of *"always"* checking to the rear because they have driven accident-free for a long time without following this practice—and have been lucky.

SUGGESTIONS:

- Understand that failing to check the rear can cause a serious accident.
- Honestly examine your own lane changing and backing behavior and resolve to improve if *"always"* is not your answer.
- If you have arthritis or joint stiffness, inquire through your physician and other sources about medications and exercises that might improve your flexibility.
- If stiffness, arthritic pain or other physical problems keep you from turning and looking to the rear as easily as you would like to, install a large, wide-angle rear-view mirror inside your car and a right-side mirror outside to aid in seeing to the rear. Make sure you learn to use the mirrors correctly because those of convex design can make objects appear much smaller and farther away than they actually are.
- Take a retraining or refresher course which highlights the problems of older drivers and suggests what can be done to reduce them. Check with the motor vehicle department to learn where such courses are given. The American Association of Retired Persons (AARP) and the American Automobile Association (AAA) have been active in this regard.

2. I wear a seatbelt.

The only acceptable answer is *"always,"* and that is true even if you are going to drive only a

short distance under ideal weather conditions. Typical accidents for older drivers occur on clear days, on straight, dry pavement, and at intersections within 15 miles of the driver's home. But to be effective, seat belts should be properly worn (see diagram).

*Proper use of currently available safety belts is essential to avoid some belt injuries. Serious or fatal injuries can occur from improper use of safety belts: *i.e.*, the shoulder belt under the arm and/or the lap belt over the soft part of the abdomen.

Wear your seat belt
correctly . . . across your
shoulder and chest.
NOT under an arm,
across your hip bones,
NOT your stomach.
It's comfortable . . . it's easy.



*New York Coalition for Safety Belt Use
Medical Society, State of New York

FACT: One-half of all traffic fatalities of record could have been lesser injuries if the people had been wearing seatbelts. When involved in accidents, those 65 and older are more likely than younger persons to be injured or killed. Our bodies are not so resilient as those of the young and we don't heal as well. In a crash, there are two collisions: (1) the vehicle against another vehicle or object, and (2) the persons inside against the interior of the vehicle. The fastened seat belt protects you against the second collision. If your car is traveling 30 miles an hour, so is everything in the car including you and the passengers. If you hit another car or object, that impact will stop your car in 1/10th of a second. This is the first collision or jolt. It is immediately followed by the second collision, when the unfastened driver, passengers and all unattached contents fly forward through windshields, against dashboards or onto concrete outside. An unbuckled occupant in a 30 mph crash will hit the dashboard or windshield with several thousand pounds of force. Passengers who are thrown from the car are 25 more times likely to die. All of this at 30 mph. What happens at higher speeds is unspeakable.

The negative tales you may have heard about seatbelts, such as being trapped in a car which catches fire, are either myths or extraordinarily

rare events. *Properly fastened seatbelts are unquestionably the number-one proved available way to reduce injuries and fatalities following a crash.*

SUGGESTIONS:

- Accept the clearly demonstrated value of seatbelts in saving lives and reducing injuries. Convince those you love and who travel with you of this value. Then make sure that you and all who ride in your car wear them, properly fastened, at all times.
- If your seatbelt is extremely uncomfortable or cannot be properly fastened (see diagram), take it to a competent mechanic for appropriate alterations.
- If your car does not have an automatic reminder to fasten seatbelts, leave yourself a conspicuous note or some other device to remind you and your passengers. Many people, with all good intentions, simply forget.

3. I try to stay informed on changes in driving and highway regulations.

The best answer is “*always*,” but “*sometimes*” is obviously better than “*never*.”

FACT: Drivers over 55 have a deficient knowledge of new developments in traffic regulation. Testing indicates that they are less familiar than younger drivers with the meaning of newer traffic control laws and devices. This deficiency encompasses such areas as right-turn-on-red laws, directional signals regulating lane use, and shared left-turn lane markings.

Knowledge of signs and symbols is vital for older drivers, especially because their ability to see and interpret these devices diminishes with age, and little is being done by highway engineers to improve the situation. The elderly themselves recognize the need to be current in these regards, to avoid the new situations they may meet on the road without knowing how to respond to them. Drivers of any age can be a menace if they do not know and follow “the rules of the road.” But older drivers, not knowing the rules, can also be fearful and hesitant in traffic. That fear can be overcome through knowledge. Another reason for remaining current is being prepared for the changes one may suddenly encounter in the license examiner’s office, where

failure may result in revocation of the license.

SUGGESTIONS:

- Convince yourself that a knowledge of current traffic laws, devices, signs and symbols is essential for the safety of yourself and those with whom you share the road. Depending on experience alone to keep informed or to help you “slide by” could be a costly, injurious miscalculation.
- Obtain and study the current driver licensing manual for your state.
- Contact your state motor vehicle department, and ask what else you can do to keep up to date.
- Enroll in a driver or refresher course for older persons, such as one mentioned earlier.

PHYSICAL CONDITIONS

(Questions 4-6)

Driving requires *sensing*, *deciding* and *acting*. *Sensing* means being alert through all senses to what is happening in traffic. Most such clues reach us through our eyes; some through our sense of hearing, a few through touch and smell. After we pick up cues for action through *sensing*, we then have to decide what to do about them. *Deciding* refers to all of the thought processes which occur between our impression of events and our response to those events. We must assess actions we might take, and choose those least likely to cause an accident or interfere with traffic.

After *deciding* what to do, we have to translate our decision into *acting*: braking or accelerating, steering, signaling, etc. . . Unfortunately for us older drivers, aging reduces our ability to meet these requirements, singly and in combination. Though we age at different rates, in different ways, in general we hear and see less well; we process information more slowly and act less quickly. Adding to the driving difficulties of some of us, are such conditions as cataract and arthritis.

4. Intersections bother me: there is too much to watch for from all directions.

Ideally you might like to answer “*never*,” but if you checked the ☐ “*sometimes*” or the ☐ “*always*,” you are not alone. Intersections are complicated centers of fast-moving

traffic, and it is difficult to "take them in" all at once.

FACT: Intersections are one of the more common sites of accidents involving older drivers (particularly when they are turning left). Intersections can be the "acid test" of how well you are doing as a driver. Certainly the more complicated intersections are among the most grueling experiences a driver faces: they enable you to judge whether your *sensing*, *deciding* and *acting* abilities are adequate for today's fast-paced traffic, or whether they are in need of improvement. If improvement seems unlikely, avoid the more complicated intersections whenever possible.

SUGGESTIONS:

- Take a good look at your driving skills and at what bothers you most at intersections. Is it an inability to handle all the information quickly enough? Is it unsureness about how to position the car for a left or right turn? Is it difficulty turning the steering wheel because of arthritis or some other physical problem? Sometimes this sort of analysis can lead you to solutions.
- Perhaps you simply do not understand what you are supposed to do at intersections and when you are supposed to do it. Studying an intersection while you are on foot may help you to negotiate it later in a car.
- Enroll in an older driver retraining course. What you learn may give you the confidence to recognize that you can do or are doing everything correctly at intersections, and that they are not as dangerous as they once appeared.
- Plan your trips to avoid busy intersections and/or use them at less congested times. Plan an alternate route to avoid left turns from busy intersections.

5. I find it difficult to decide when to join traffic on a busy interstate highway.

Most of us would like to answer "*never*," but if you checked "*sometimes*" or "*always*," you would not be alone in expressing feelings of insecurity and nervousness about entering a busy interstate highway. Older drivers admit to a lack of confidence and feeling nervous on such roads. Because they dislike the speed of traffic and the number of cars on interstates, some say they

never use them. That is unfortunate, for they are the safest of all roads.

FACT: On the basis of miles driven, free-ways show considerably lower fatality rates than conventional two-lane, two-way highways. The decision to use or not use a busy interstate is based on personal feelings of ability to drive on it safely. Interstate highways were built long after most of the elderly learned to drive. If they were living where interstates were convenient and often traveled, they probably gained experience to feel confident about driving on them. However, other older drivers, especially women who did little if any driving until late in life, and people living in rural and suburban areas, probably had little experience with interstates and consequently are fearful of what they "don't know" about them. In addition there are more cars, faster traffic and more congestion. Unless older drivers have stayed informed of these changes, and have made them part of their everyday driving experience, free-ways can be intimidating.

Of course aging and the normal decline in sensing, deciding and acting abilities can make an aware individual fearful about interstates. The reasons most often expressed are that "people drive too fast on them." To some older drivers, these may be valid reasons for avoiding interstates. But greater knowledge of proper operating procedures on them might encourage greater use. It would be unrealistic to avoid our safest highways in the name of safety.

SUGGESTIONS:

- Judge where you are in relation to the knowledge and skills needed to drive on interstates. Be honest with yourself.
- If you decide you do not know enough about them, and that reluctance to enter them may in part be "a fear of the unknown," take a driver refresher course to learn how to use interstates properly.
- If you decide you have the ability to drive on interstates safely, ask an experienced, safe driver to ride with you and suggest what you should and should not do. Then *practice* when traffic is less congested.
- If, regardless of what you learn to do, you still are nervous and have doubts about driving on

interstates, try to avoid them. You are your own best judge of whether they are safe for *you*, regardless of how safe they may be for others.

6. I think I am slower than I used to be in reacting to dangerous driving situations.

"Never" is the only satisfactory answer here. Emergencies and dangerous situations may be relatively uncommon, but fast and safe reaction to them is essential. While good *sensing*, *deciding* and *acting* are all necessary for safe driving, these skills come together in acting—what you do or fail to do quickly enough to avoid an accident. It is in acting that older drivers most markedly demonstrate a slowing down.

FACT: Older drivers have trouble integrating information from several sources at once, and therefore respond less quickly to hazardous situations. We are all subject to the physical and psychological changes of aging, but some of these changes can be hazardous to our driving. The increased accident rate per mile of travel beginning between ages 55 and 65 parallels certain age-related declines in driving skills. Our response as drivers represents a series of events beginning with what is seen or heard, then giving meaning to this information, judging what action is necessary, and sending instruction to the appropriate muscles to respond. This response—the "bottom line" in avoiding an accident—is dependent on the total bodily system.

Changes in the muscles and bones account in part for the increase in the rates of accident and severe injury of drivers over 55. Reaction time is necessarily increased by arthritic joints and tight musculature, and joint flexibility and muscle strength diminish with age. But there *are* steps that most drivers can take to improve their response to dangerous situations.

SUGGESTIONS:

- Enroll in an older-driver refresher course where you can learn to increase your ability to organize information more rapidly and to anticipate and avoid dangerous situations.
- Avoid, when you can, driving in congested, complex, fast-moving traffic.
- Keep yourself physically fit and mentally stimulated, and avoid driving if you are tired, ill, or have taken any drug (including alcohol) that

will slow your mental or physical responses.

- Under supervision, engage in exercise to maintain or increase the flexibility of your joints and your muscular strength.
- If joint and muscle impairments are serious, investigate medical and surgical therapies. Anti-inflammatory drugs and various surgical procedures, including total joint replacement, will in some cases lessen impairment sufficiently to permit safer driving.
- Identify and obtain devices—such as power steering, power brakes, power seats, wide view mirrors, etc.—that compensate for losses of flexibility and strength.

EMOTIONS (Questions 7-9)

Emotions are those strong feelings that can control our behavior as we interact with the automobile, with other people, and the environment at large. One example would be hostile or aggressive feelings directed toward other drivers; another would be inattention to driving because thinking is directed to other personal situations. Driving, as we have said, is a complicated task requiring continuous concentration. Highly emotional states which interfere with this concentration are dangerous.

7. When I am really upset I show it in my driving.

The only acceptable answer is "*never*." It takes only a brief acting out of emotions or a moment of inattention to produce an accident. Anger is an emotion to keep out of the car when you are in it with the motor running.

FACT: "Man drives as he lives." As we age, experience and good judgment can help us continue to be good drivers. However, the consequences of aging are not always pleasant, and may generate hostilities that we direct toward others—in some cases, drivers. Most of us are extensions of what we were in our youth. If we were aggressive and hostile on the road when young, we are likely to be much the same today. The difference is that now, because of decreased driving skills, we may not have the ability to recover from those dangerous highway situations that arise out of aggression and hostility.

The saying that "man drives as he lives" is supported by generations of research. Those in trouble with driving are usually in trouble in other life situations. The "milk toast" person at home or office who turns aggressive on the highway is largely a myth. Some people have a free-floating hostility which is in fact permanently indwelling anger that shows itself frequently in response to trivial happenings. These people find too many things to get upset about and get angrier than the situation calls for. In driving, as in other activities, they are impatient, aggressive, and hostile.

One remedy for getting the anger out of the car may be to get it out of one's life. If we are willing to examine the attitudes that control our behavior in the outside world, we may be able to shift from a "hazardous lane" to a "safer lane."

SUGGESTIONS:

- When you know that you are very emotional about something, delay driving until you have calmed down.
- As we age, we tend to slow down and become more cautious. We may even control our anger, at least outwardly. But it may seethe inside us. Unless we have a healthy "release valve," however, the bottled up anger can literally "pop the cork" and lead to physical illness or explosive situations—in the daily rounds of life as on the highway.
- Awareness is the first step toward controlling anger. The second step is handling it in a healthy manner such as a vigorous walk—several times around the block, or more if necessary; or a talk with a friend or a professional counselor. Getting behind the wheel in a high emotional state—whether joy or anger—diverts attention from the driving task, and invites trouble.

8. My thoughts wander when I am driving.

The ideal answer is "*never*," but even the best drivers catch themselves at this "*sometimes*." However if you checked the ☐ for "*always*," you are a dangerous driver—"an accident looking for a place to happen." Driving, we say again, is a complicated and demanding task. It takes continuous concentration, and even momentary lapses can lead to danger.

FACT: Investigations of accidents and fatalities of older drivers, particularly those

over age 65, show errors of omission (failing to take some action) and inattention as underlying causes, or at least as contributing factors. Not seeing road signs and stop signs, failing to yield, and so on, are major problems of older drivers cited for violations and/or involved in accidents. They are thought to be due to inattention—i.e., driving while thinking of other things. When we allow any strong emotion such as joy, anger or sadness, to distract us from the driving task we are wide open for accident. Driving is a complex task, involving all the senses, split-second decision making, and quick, decisive action. The first rule for all drivers should be undivided, concentrated attention to that demanding task.

Yet many of us have seen drivers in animated conversation and looking at others in the car with minimum attention to the road. Still other drivers will drink coffee or try to glance at a newspaper while underway. In an emergency they may not be able to return from their diversion in time to take evasive action. Advancing age brings with it a slowness of recovery. Many conditions can interfere with our ability to concentrate: emotional upset, fatigue, illness, medications, alcohol, full meals, pain, a loud radio, lack of oxygen to the brain. The least we should do is not let our minds wander.

SUGGESTIONS:

- Make up your mind to accept driving as a complicated task requiring your full attention.
- If you catch yourself "daydreaming" or otherwise failing to concentrate on your driving, identify what is diverting you and try to overcome it.
- Take the necessary steps to remove or reduce distractions, whether they are those over which you have control or those for which you will need help.

9. Traffic situations make me angry.

The best answer is "*never*," but those who have been stuck in traffic long periods understand the checking of "*sometimes*." However, a ☐ "*always*" reveals that some changes are needed.

FACT: Anger behind the wheel comes out in dangerous ways. Most people trapped in slow moving traffic feel frustrated. Eventually

their frustration leads to anger. Most drivers, however, direct their anger at the situation, not at other people. Those who "take it out" on other drivers and blow their horns and gesture are responding irrationally to anger. They may check their watches often; they may drive very fast and erratically when there is any opportunity to close an open space in the jam. It becomes clear that traffic is giving them the opportunity to act out their anger. What is less clear is that they are probably angry and troubled about other aspects of their lives. Traffic is merely a convenient outlet.

Fear, too, can generate anger. Older drivers afraid of finding themselves in confounding traffic situations and not knowing what to do sometimes respond with anger—in the actual situation, or even in contemplation of it. Or they may be afraid of drivers who go too fast or cut them off. Again they may respond with anger. The danger is that anger will make them less rational and impede their driving abilities.

Furthermore, out of anger drivers may be tempted to take risks they otherwise might not take. Many older drivers so tempted do not recover their skills quickly enough to avoid trouble.

SUGGESTIONS:

- Accept the fact that anger will do nothing to get you out of irritating traffic situations. On the contrary, it may get you into accidents.
- Recognize when you are becoming angry. Then examine why anger seems to reach irrational proportions. Say to yourself, "Why am I getting upset?" And try to take the necessary corrective steps. Keep cool.
- Try to avoid the kind of traffic you know is likely to generate anger. The smoother the traffic flow, the less the anger, the fewer the accidents.
- If you are converting fear of traffic into anger, try to take the steps necessary to overcome the fear. Perhaps the knowledge and special training through the older-driver courses will help. You can at least make an effort.

HEALTH HABITS (Questions 10-12)

Health habits are those everyday practices having to do with exercise, nutrition, and mental condition. Good health habits help keep our

minds and bodies in top condition. They should include regular visits with professional care takers for checkups and preventive health education. Good health habits improve the *sensing*, *deciding* and *acting* skills required for safe driving. Good vision can keep us out of accidents. Remaining mentally alert can help us to decide more quickly. Exercise can improve our flexibility and strength of response in driving maneuvers. Good nutritional practices can strengthen our bone structure against injurious accidents.

We are, for the most part, in control of our own health practices, including some such as drinking and driving, which are directly related to traffic accidents and fatalities. Whether we exercise this control and do our best to preserve our good health, mobility and independence is up to us.

10. I get regular eye checks to keep my vision at its sharpest.

The only acceptable answer is "*always*." The "eyes have it" when it comes to the influence of good health habits on safe driving.

FACT: Eighty-five to ninety-five percent of all sensing clues in driving come through the eyes. Poor visual capacity is directly related to poor driving. Reduced performance from faulty vision shows up in slowed response to signals, signs and traffic events in ways that can lead to an accident.

Decline of visual acuity—the ability to see detail—comes naturally with aging. After age 45, most people need glasses to see well either at a distance, or up close, or both. The ability of the eyes to focus decreases with age, and it becomes more difficult to change focus from distant to near objects and vice versa. The pupils become smaller, the muscles less elastic, and the lenses become thicker and less clear. Thus the need for more light.

The amount of light required to detect a given object doubles every thirteen years. A 45-year old driver must have four times the light required by a 19-year-old. This is only one of the factors that make night driving especially difficult for seniors. The elderly also have a lower tolerance for bright lights; they more easily suffer temporary blindness from the headlights of other cars. As lenses of the eye age, they thicken and become yellow, causing light to scatter when it enters the eye, thereby producing

a fogging vision and glare. Older drivers do not recover from glare as quickly or fully as younger drivers. A 55-year-old takes eight times as long to recover from glare as a 16-year-old.

Peripheral vision, the ability to see to the side while looking straight ahead, also diminishes with age. This may explain why older drivers have trouble picking up information from the side of the car. Ninety-eight percent of the visual communication that a driver receives comes through peripheral vision. Those with poor peripheral vision in both eyes have accident rates twice as high as those with normal peripheral vision. It becomes more difficult to distinguish color as one ages, and traffic signals may appear dimmer. Red colors do not appear bright to many older eyes, and it may take some senior drivers twice as long as it took in earlier years to detect the flash of brake lights.

Another visual ability that declines over the years is depth perception: how close or how far you are in relation to a car or object ahead. This capacity is especially critical when trying to judge how fast other cars are coming.

Such medical conditions as cataract, glaucoma, and diabetes are more common with age, and can also be dangerous for driving. In short, many conditions can worsen the driving ability of older drivers; awareness of these conditions is critical for the next step—doing something about them.

SUGGESTIONS:

- First and foremost, establish periodic examinations with your eye doctor. Tell the doctor that you are interested not simply in an “eye chart” test but in a thorough examination that will help you to remain a safe driver. Take the corrective steps recommended. If eyeglasses are prescribed, keep them up to date by letting the doctor know at once if they are not working well for you.
- Enroll in an older driver retraining course where you can learn specific techniques for coping with the limits imposed by aging eyes. Improvement will come through your own efforts and/or through special devices that can be installed in your car.
- Accept the limits of “aging eyes,” and reduce the amount of driving you do after dark and at

twilight (one of the most dangerous times). The chances of having an accident are three times greater at night than in daytime.

- Avoid tinted windshields, and always keep your windshield and headlights clean.

11. I check with my doctor about the effects of my medications on driving ability.

The only acceptable answer is “*always*.” Some of the most innocent sounding medications (including those purchased without a prescription) can have a negative effect on driving. Even a one-time lapse in checking what that effect might be can produce unfortunate consequences. The drugs that slow us down generally reduce our capacity to *decide* and our ability to process information rapidly enough to maneuver the vehicle safely. Another drug (which many may not think of as one) with this same effect is alcohol—probably the single most important human factor in fatal accidents for drivers over 65 (as well as for younger drivers).

FACT: Twenty-five percent of all drug prescriptions go to people over 65, who make up 11 percent of the total population. Older people consume more drugs than any age group. Some of them suffer multiple medical problems and chronic illnesses requiring not only daily medication, but combinations of medications. Frequently they are unaware of the possible effects of these medications on their driving ability. Why? Because there is no communication between them and their medical doctor about the matter, and there may be no understandable statement about the side effects in the instructions on the prescription container.

Furthermore, some older people may be under the care of several doctors, all writing prescriptions with little or no knowledge of what others have prescribed. The drug mixtures of several prescriptions can induce unpredictable reactions and side effects. We may be sure, however, that if these have an effect on driving skills, it will be a negative one. All the more so for older persons because of their increased sensitivity to medication and their susceptibility to unusual reactions. While one might be wary of the effects of prescription drugs, even those sold without prescription (over-the-counter) can reduce driving ability. Cold tablets, cough syrup and sleeping pills are among these.

It is important to avoid alcoholic beverages when taking other medications. With few exceptions, the combination of alcohol and other drugs increases the impairment of driving skills that would occur with alcohol or certain other drugs alone. Together they make a potent additive that in extreme cases can cause coma or death. In relation to driving, the only safe practice is to avoid alcohol altogether if there is a chance of driving. Half of all traffic fatalities involve someone who has been drinking. There is no question that alcohol lessens the skills required for safe driving. One's tolerance of alcohol decreases steadily with age, apart from any personal history of drinking. Alcohol has a powerful impact on our total system, physical and psychological. All other things being equal, whoever starts drinking at age 60 will become intoxicated much faster on less alcohol than a 35-year-old taking a first drink. Older people are also less efficient at ridding the system of alcohol; and food, mood, fatigue, medication, general health, weight, size of body can all make a difference in predicting overall effect.

Taking into account the deterioration in skill over which aging drivers have little or no control, it simply makes good sense to avoid drinking then driving. Why push our luck? Furthermore, heightened public concern with the tragedies of driving while intoxicated has led to costly penalties, including high fines, jail and revocation of license—extraordinarily uncomfortable consequences at best.

SUGGESTIONS:

- Convince yourself that even prescribed medications may have a negative influence on your driving skills.
- Check with your physician to determine what the side effects of a prescribed medication might be and what, if anything, you can do to counter them, particularly as they apply to driving. If more than one physician is prescribing for you, make sure all of them know about all the drugs you are taking, whether prescribed or not.
- Read all labels and instructions on prescriptions and over-the-counter drugs to determine side effects and their relationship to when and where you should or should not drive.
- Keep telling yourself that the only safe action

at your age is not to drink alcoholic beverages at all if you intend to drive, and not to ride with anyone who has been drinking. There are many ways to accomplish this. You probably know some of them from television, newspapers and other sources. But you have to choose a way that works for you. The driver retraining courses referred to throughout this discussion provide opportunities to explore effective counter-measures. Just another very important reason for enrolling.

12. I try to stay abreast of current information on health practices and habits.

Our preferred answer is "*always*," but we cannot always do all the things we want to do; "*sometimes*" is therefore understandable. However, a "*never*" ☐ answer would seem to identify one who has given up on personal health, or who may feel loss of control over it. In relation to driving, this could be someone just waiting for the inevitable—perhaps the revocation of a driver's license because of unsafe performance. If this is true of you, the better way is voluntarily to turn in your license before somebody is injured, and to plan alternative transportation. However, remaining up to date in terms of preserving our health and our driving skills is very much within the control of most of us. We are going to try to convince you of that, and tell you why it is important.

FACT: Four-fifths of the two million annual deaths in the United States and more than half of the disabilities caused by chronic disease are closely related to personal health habits and behavior. Individual life styles have a direct relationship to longevity and the quality of life. It all begins with your attitude about how much control you believe you have over the quality of your life, and ends with how much of it you are willing to exercise.

It has been said that the greatest discovery of our generation is that human beings, by changing their attitudes, can change the outer aspects of their lives. Those of you who answered "*always*" are presumably always on the lookout for new information about ways to improve how you feel and act, and how you can attain and keep the life style which gives you the most satisfaction. In relation to driving that means the mobility and the independence that come with keeping

your license.

And you will do all you can to keep it. This will include ways to remain alert and quick to respond in driving, and ways to keep up to date in health habits and the requirements of safe driving. Following these ways will help you to feel confident and in control of yourself when you drive.

Unfortunately, not everyone is an “always” person, and the people least likely to change behavior for the good are the ones most at risk. We wonder if they know what they are missing. If they have simply given up, they should be told there is reason to become interested again. True, we have repeated throughout this discussion that with age comes a reduction of driving skill. But even though research points to changes in the central nervous system as the culprits, it appears *“possible that life habits of physical exercise reduce the extent of slowing with age; increased motivation may do this too. Practice reduces the extent of slowing, and extended practice may eliminate it completely. Finally, it is most important to recognize that whatever the significance of the slowing with age, the magnitude of the individual differences is very great. Very many old people are quicker in responding than many young adults.”*

And there you are! One of the purposes of this self-rating form is to help you become, if you are not already, an “activated driver”—one of those who assume responsibility for their own driving skills and who self-examine and compare their ability with the requirements for safe driving. The premise of the form is that through knowledge and self-awareness you will understand what a safe driver is and will assume the responsibility to remain or become one, or decide to give up the driver’s license and seek other means of transport. Furthermore we want you to appreciate fully the close ties between personal health habits and driving skills. The attitude that encourages you to remain informed on health practices probably will also help you to feel in control of your future as a driver.

SUGGESTIONS:

- Think realistically about how much control you have and/or want in terms of health habits as they relate to your life in general and to your driving.

- Learn the relationships between good health practices and their meaning for your future as a driver. Keep in mind that the slowness that comes with aging can be restricted or overcome by motivation, regular exercise and practice.

- Take as much control as you can of your health habits and life style, recognizing the obvious connection between command of personal health and skill in driving.

- Understand the value of nutrition, exercise, medical check ups, and the effects of medications, drugs and alcohol.

RECORDS AND OTHER INDICATORS

(Questions 13-15)

There are numerous ways we receive “feedback” on our driving ability. Police cite us when we disobey a law; and, if we are convicted, the citation becomes part of our driving Record. If we have an accident exceeding a defined degree of seriousness, regardless of fault, that too becomes part of our Record, including the one kept by our insurance company.

Concerned family members and friends may point out that we are dangerous drivers and that we should either take steps to reduce the danger or give up our license. That recommendation is often made, but seldom followed. Few older drivers voluntarily surrender a license. It is too important to them. In fact, it is so important that it distorts their own ability to accept the fact of their dangerous performance so obvious to others. They deny they are doing as poorly as the records and other indicators reveal. This self-rating form is one way to persuade older drivers to be more realistic about their driving. It contains Suggestions on how to maintain and enhance their skills and overcome their deficiencies.

Its purpose is also to compare our own impression of how safely we drive with what is suggested by records and other indicators. Not unlike people of all other age groups, we act on what we believe to be true, more so than on what may in fact be true. Therefore it is hoped this self-rating will help us to see ourselves as clearly as possible, so that we can take whatever action seems warranted in truth, in the best way we can find it.

13. My children, other family members or friends are concerned about my driving ability.

"Never" is the best answer here, but most of us probably have been aware of critical comments on our driving. We might have felt that the critics were worse drivers than we, or were just generally afraid in certain traffic situations, no matter who was driving. And we may have been correct on one or both counts. However, when we check the ☐ "sometimes" or, more especially, the ☐ "always," we have a more valid reason to pay attention than we would like to admit.

FACT: Drivers over 50 have the highest misconceptions of the actual risk of having an accident. These misconceptions grow with age. Furthermore older drivers underestimate the relationship of their own actions and problems to accident risk. Over 80% of the senior drivers surveyed feel they have total control over accidents; and 90% believe the cause of any accident involving their vehicle lies outside their own behavior. The denial that one's own self has age-related problems is a dangerous supposition, especially when applied to driving.

There is little doubt that denial is a psychological method of coping, because admitting that one is less able or less in control, would be opposed to the American values which venerate youth and the capacities and energies associated with it. Denial in relation to driving abilities is reinforced because the giving up of a license is an extremely traumatic event: it relates not only to life style, but, for many, to survival—and with good reason, for only 15% of the American population has access to mass transportation. It is understandable, then, that older drivers resist comments that threaten the continuance of driving. Yet these are voices to be listened to—at least for clues about how we might improve.

SUGGESTIONS:

- Lend an open ear to the comments of those concerned about your driving, and keep an open mind. Be sure you are not dismissing the value of these comments out of denial: burying your head, ostrich-like, in the ground.
- Look for clues to overcome the dangers of

those comments you judge valid. It is possible that a retraining course or such corrective action as treatment for faulty vision or other physical problem might help. So might more caution in relation to medications and alcohol.

- Begin to prepare for the day when driving will no longer be possible for you. With adequate planning, a non-driving life may not be so bad as it seems.

14. How many traffic tickets, warnings or "discussions" with officers have you had in the past two years?

Of course "none" is the preferred answer here, for it would be a sign that you are doing everything you should be doing to remain a safe driver (or—between us—that you haven't yet been caught doing things you should not be doing). "One or two" might mean that you are not as current as you should be on laws and rules of the road; this shortcoming can be handled in ways already discussed in these pages. "Three or more" demands a serious look at how you are driving, a look free of the denial we have described. To be stopped many times suggests that you must be driving dangerously a good part of the time. If little can realistically be done to reduce that danger, you should make alternate plans for transportation.

FACT: Some older drivers are aware of their limits and cope with them. Others, however, overestimate their real capabilities and their compensatory behavior is not adequate. They do not always have a clear impression of their driving problem, and may even feel that their driving is good when it really isn't. When questioned about their most obvious errors, most of them claimed to be unaware that they had made those errors. The most cited problems of older drivers include failure to yield, failure to observe signs and signals, careless crossing of intersections, changing lanes without due regard for others, improper backing, and driving too slowly. Inattention and stimulus overload (i.e., too much information to handle well) seem to lie at the root of most of these conditions.

SUGGESTIONS:

- If you have received traffic citations or "warnings," examine the details for the probable

causes. If one cause appears to be inadequate knowledge of traffic regulations or specific signs and signals, find out where you can obtain the latest information. Get it and learn it. If citations are due to a physical condition (such as poor vision, resulting in missed signs and signals), try to have the condition corrected. If the citations seem to be caused by inattention, resolve to pay constant attention behind the wheel. If the problem seems to be information overload—inability to take everything in quickly enough to act properly—look for an older driver retraining course.

- If causes of citations seem deeper, reexamine those about which you can do little by yourself. Perhaps you can find some improvement through devices installed in the car. Keep in mind that what should be done, should be done quickly, for citations relate directly to accidents; and one citation can be a warning that trouble is coming unless some changes are made.

15. How many accidents have you had during the past two years?

Once again, “*none*” is the most desirable answer. Depending on the severity, “*one or two*” can be one or two too many. If you answered “*three or more*,” we are thankful that you are here and able to participate in this self-evaluation experience, and, if you will admit it, so are you.

FACT: An accident is the best predictor of another accident. One accident is often a signal that others are on the way. Typical older-driver accidents occur on clear days, on straight, dry pavement, and at intersections within 15 miles of the driver’s home. Ninety percent of these generally show lower speeds than similar accidents among younger drivers. They involve more than one vehicle, and result in less serious vehicle damage. But injury rates are higher for seniors.

Older drivers are likely to be held at fault for many of the same reasons for which they receive citations: failing to yield, not observing traffic signs and signals, careless crossing at intersections, improper turning and lane changing, and careless backing. Furthermore seniors with the most recorded accidents do most of their driving under conditions conducive to accidents—at night and in bad weather. They also have a

higher incidence of medical conditions (e.g., heart and artery problems, arthritis, broken bones, visual and hearing problems, and diabetes).

However, basic to a considerable number of the actions (or non-actions) that produce older-driver accidents are inattention, and a slowness in processing information and taking the required action. If older drivers honestly confront themselves, they may begin to admit that they do not see well at night, have missed signs, are nervous in traffic and are defensive about their own driving skills. It is to be hoped that such admission will lead to corrective actions.

It may also help eliminate their attempts to deny their lowered ability to cope safely with traffic situations. This denial is probably the older driver’s most pervasive danger because it encourages continuation of a degenerating driving behavior without seeking ways to improve it. Without correction, this situation can lead to tragedy.

Not to be forgotten is the possibility that a driver at fault can see his financial resources wiped out by high liability claims, even when insured. To the older person who has lived conservatively in order to remain financially independent or to leave a “nest egg” to heirs or a worthy cause, this can be an ironic turn of events indeed, tragic enough to ruin the twilight years.

SUGGESTIONS AND CONCLUSIONS:

- As the records tell us, most older drivers do pretty well, and we can be proud of being among them. They recognize many of their own problems, and a lot of advice we have been offering in these pages they do not need. Many of you already compensate for the limits you see in yourself as drivers. You avoid night time driving, dense traffic periods, and the personal behavior and life style that contribute to accidents.

However, it is important to recognize that many traffic changes have occurred in our lifetime, and that it is equally important for us to update ourselves on these to remain safe drivers. Furthermore, few of us have had any formal training as drivers, and there is much new knowledge about good driving practices that can improve traffic safety for all.

Many of our shortcomings can be dealt with

through older-driver refresher courses. Check with your state motor vehicle department to find out where courses are available. As we have said, The American Association of Retired Persons (AARP) and The American Automobile Association (AAA) have been active in such offerings. If you discover that no course is available to you, urge the above named organizations and your local community college to institute one you can take.

- We hope that as you reviewed your score and the meaning, explanations and suggestions for the ☐ and ☐ you became more aware of ways to improve your driving performance. Keeping the driver's license is critical for our mobility, our independence and our well being. We have shared with you all we can toward that end within the framework of this self-rating. We repeat the central idea: to put you more in control of your own future as a

driver and to suggest steps you should take to retain that control and continue to drive safely.

Remember, this self-evaluation is only one step—a motivator—to a more comprehensive and continuing evaluation of your driving abilities. For a more complete assessment, as this might become required, many more questions would be necessary, along with medical, physical, behind-the-wheel and written or oral examinations of traffic knowledge.

- No matter how good we are at driving, there comes a day when we must give it up to avoid injury to ourselves and those with whom we share the road. In our own self-interest we should delay that day as long as we can. But when our self-examination and other inputs tell us we can no longer correct our shortcomings adequately enough to drive safely, we must plan for other ways to get around. ■

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Appendix C

Diagrams and Graphs Regarding Traffic Accidents, Traffic Volumes and Aging Drivers

NPA Data Service Inc. and U.S. Bureau of Census Percent Population Age 60 and Over

	USA	MONTANA	LAKE COUNTY	RONAN CITY	POLSON CITY	ARLEE CITY	ST. IGNATIUS
1900	6.4	4.2	N/A	N/A	N/A	N/A	N/A
1970	14.1	14.0	18.7	N/A	N/A	N/A	N/A
1980	15.7	15.2	18.8	26.5	26.2	N/A	15.6
1990	16.8	17.6	20%	26%	26%	14%	23%

State Highway Accident Information System

1990 Accident Clusters

		Length In Miles	Total	Acc.	Acc./Mile	
P7	27.0 - 90.1 (46.5 - 49.5)	60.0	166	2.77		Darby-Missoula
P1	110 - 171 (119.6 - 124.7)	55.9	141	2.52		Kalispell-E&W
P5	0 - 59.3	59.3	139	2.34		Missoula-Polson
P7	49.5 - 90.1	40.6	138	*	3.40	Hamilton-Missoula
P52	0 - 51.1	51.1	119	2.32		Polson-Big Fork-S.Kalispell
P1	124.7 - 170.7	46.0	112	*	2.43	Kalispell E
P50	32.8 - 87.0	54.3	98	1.80		Big Sky S-Belgrade
P7	1.4 - 61.4 (46.5 - 49.5)	57.0	83	*	1.46	Idaho-Victor
P1	1.5 - 61.5 (31.8 - 32.7)	59.1	82	1.39		Idaho-Libby E
P5	114.9 - 153.5 (126.4 - 128.9)	36.2	77	2.13		Kalispell S-Whitefish N
P5	62.2 - 109.6	47.4	69	1.46		Polson-Somers S
P8	21.2 - 87.8 (39.8 - 46.6)	60	68	1.13		Elliston-Townsend
P1	59.6 - 119.6	60	63	1.05		Libby E-Kalispell
P5	114.9 - 126.4	11.5	57	*	4.96	Kalispell-Whitefish
P8	46.4 - 87.8	41.4	49	*	1.18	Helena-Townsend
P11	0 - 51.8	51.8	42	0.81		West Yellowstone-Livingston

() Urban Area Exclusions
* Portions of other Areas

State Highway Accident Information System
Age 60 Years and Older
(1986-1989)

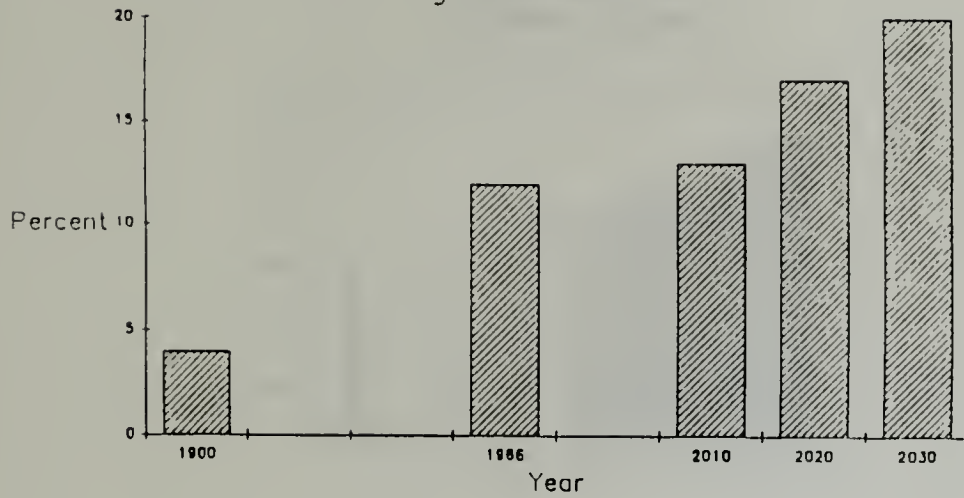
	<u>Milepoints</u>	<u>Length In Miles</u>	<u>Accidents</u>	<u>Accident/Mile</u>	
P7	25.8 - 85.5	59.7	144	2.41	Darby-Missoula
P5	0 - 59.3	59.3	139	2.34	I90-Polson
P50	32.8 - 87.0	54.3	99	1.82	S of Big Sky- Bozeman
P5	62.2 - 110.7	48.5	70	1.44	Polson-Kalispell
P1	1.5 - 61.2	59.7	82	1.37	State Line- E of Libby

Drivers age 60 and Over

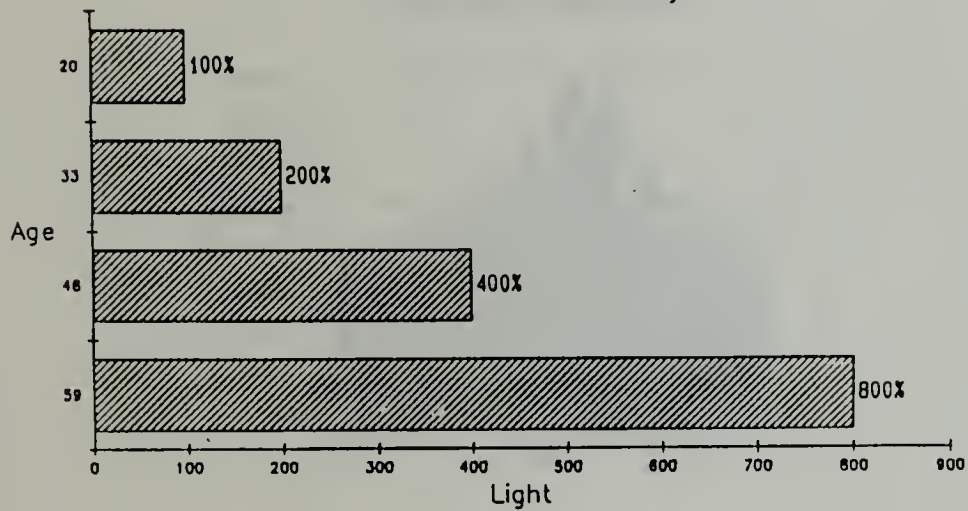
High Accident Corridors
(1986-1989)

Route	Milepoint	Route Description	Accidents	Injury Acc.	Miles
P7	30.000 - 60.000	US 93 S of Missoula	103	42	30
P5	0.000 - 30.000	US 93 N of Missoula	76	34	30
P7	60.000 - 90.000	US 93 S of Missoula	71	27	30
P5	114.961 - 144.961	US 93 N of Kalispell	67	25	30
P5	30.000 - 59.335	US 93 S of Polson	65	27	29.335
P1	124.717 - 154.716	US 2 E of Kalispell	61	33	30
I90	300.000 - 330.000	I 90 Bozeman-Livingston	58	23	30
I90	420.000 - 450.000	I 90 Billings	54	23	30
I15	120.000 - 150.000	I 15 N of Butte	48	14	30
P52	30.000 - 51.147	Flathead E. Shore Rd	47	16	21.147
P52	0.000 - 30.000	Flathead E. Shore Rd	45	15	30
I90	90.000 - 120.000	I 90 Missoula	42	23	30
P1	30.000 - 60.000	US 2 E of Libby	36	14	30
P4	30.000 - 53.561	S of Laurel	35	15	23.561
P50	50.000 - 87.095	S of Bozeman	32	14	27.095
P5	90.000 - 109.612	S of Kalispell	32	15	19.612

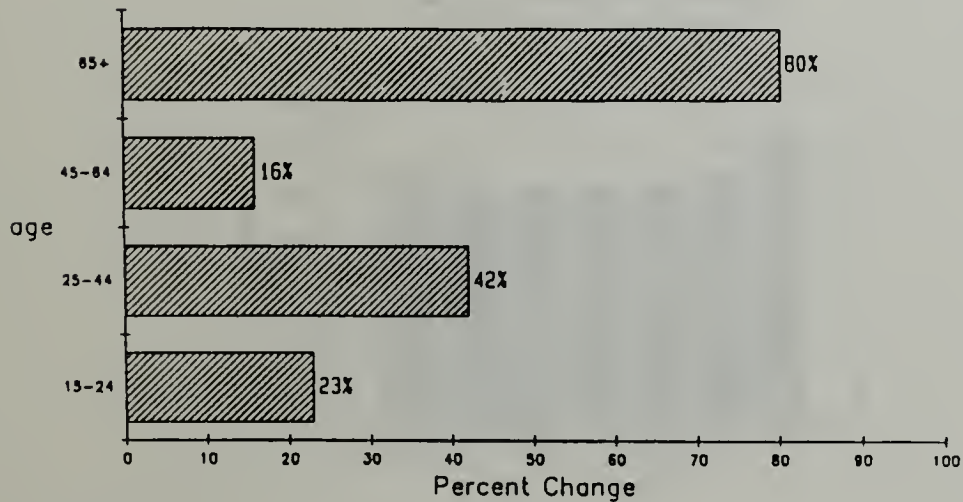
Percent of Total Population
Aged 65 & Over



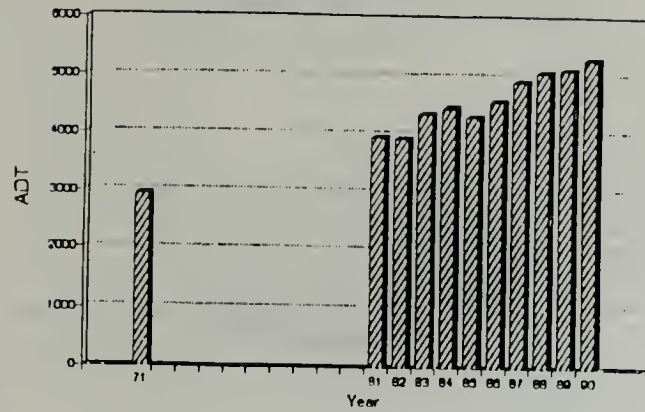
Amount of Light Required to See During
Hours of Darkness Doubles Every 13 Years



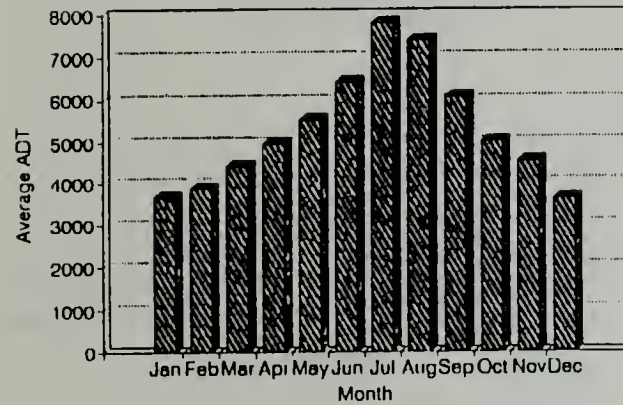
Increase in Driver Population
From 1970-1982



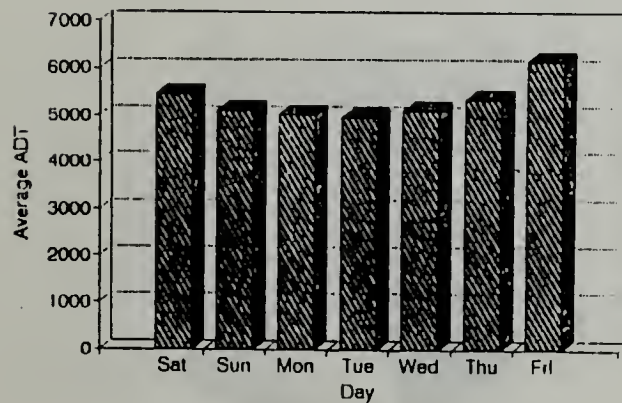
ADT U.S. 93 S of Ravalli (0.5 Mile)



ADT by Month S of Ravalli .5 Mile (1990)

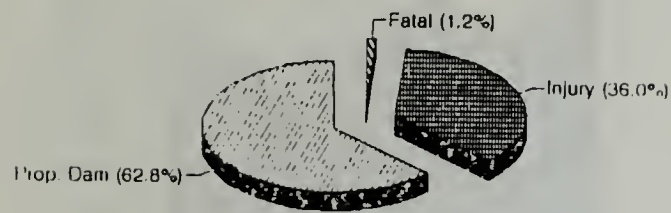


ADT by Day of Week S of Ravalli .5 Mile (1990)



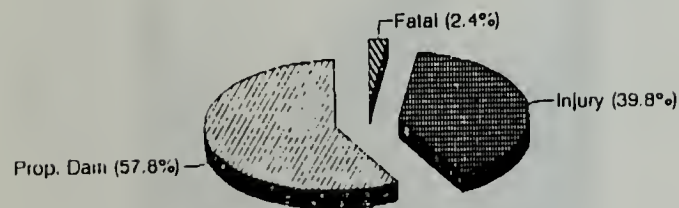
Accident Severity

Statewide-Federal Aid: All Ages



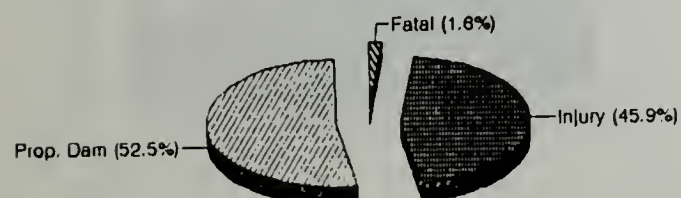
Accident Severity

Study Site: All Ages



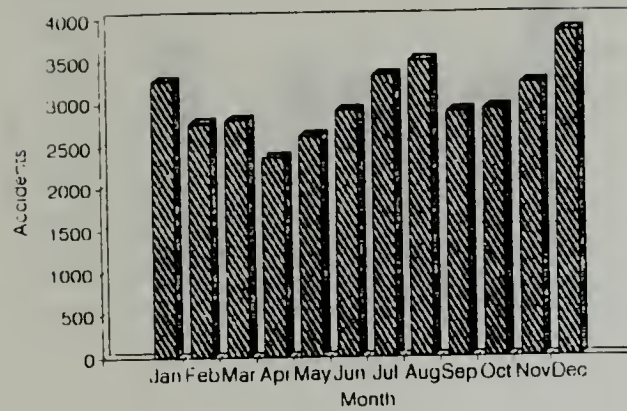
Accident Severity

Study Site: 60 and Over



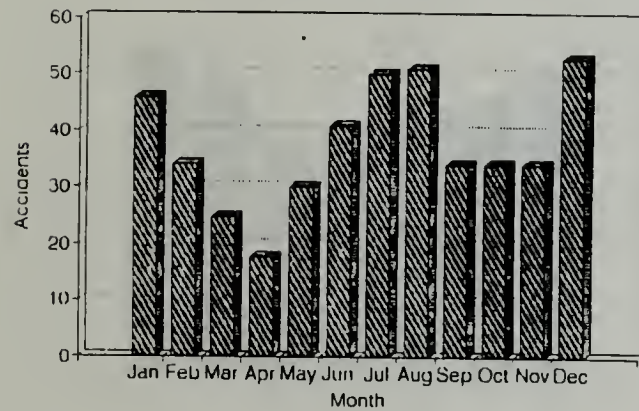
Accidents by Month

Statewide-Federal Aid: All Ages



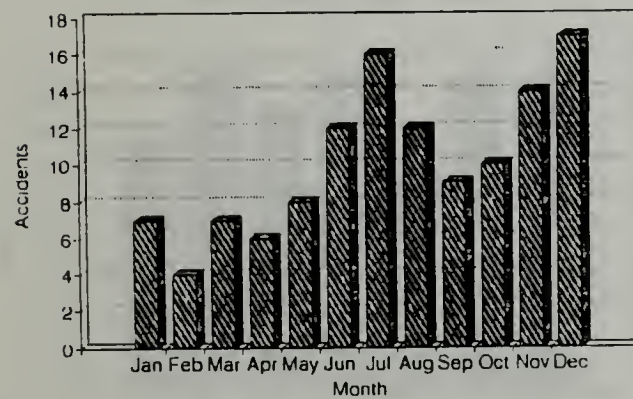
Accidents by Month

Study Site: All Ages



Accidents by Month

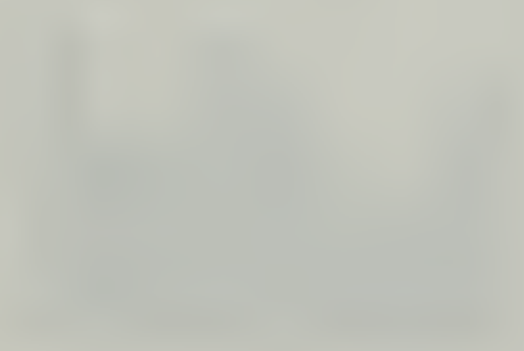
Study Site: 60 and Over



THE HISTORY OF THE CITY OF BOSTON



CHAPTER I. OF THE FOUNDATION OF THE CITY.

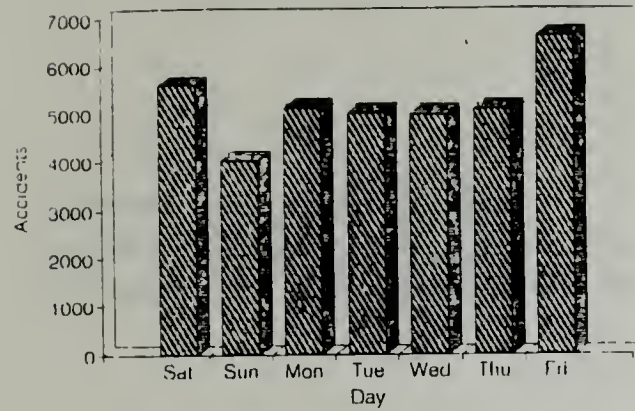


CHAPTER II. OF THE EARLY SETTLEMENTS.



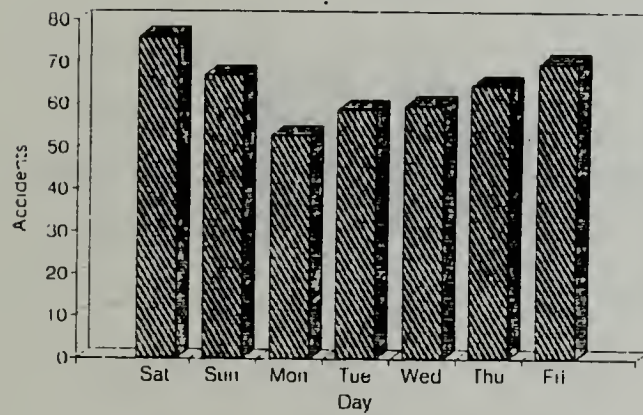
Accidents by Day of Week

Statewide-Federal Aid: All Ages



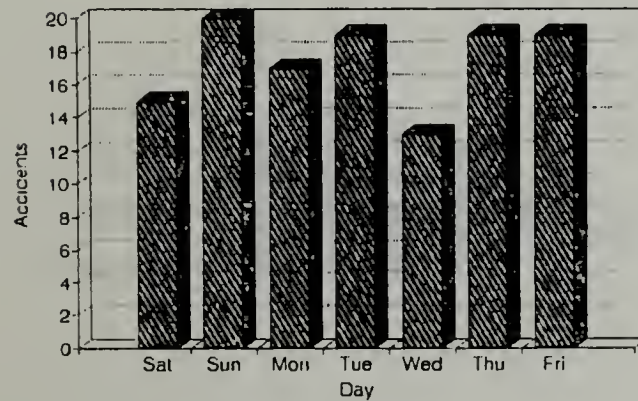
Accidents by Day of Week

Study Site: All Ages



Accidents by Day of Week

Study Site: 60 and Over



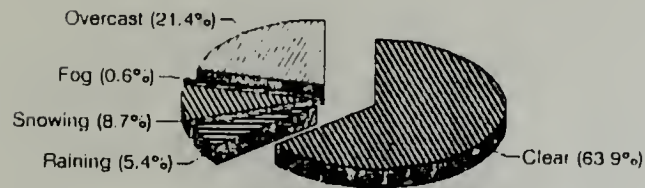
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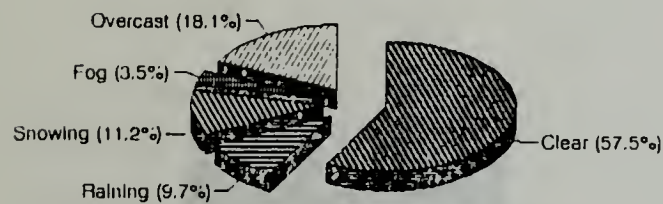
Accidents by Weather Condition

Statewide-Federal Aid: All Ages



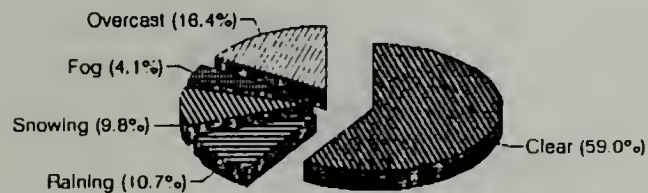
Accidents by Weather Condition

Study Site: All Ages



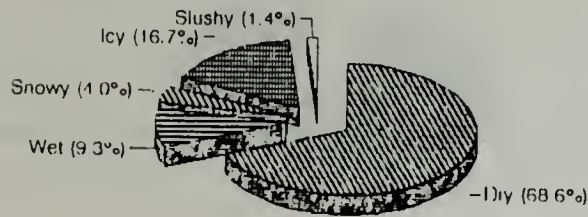
Accidents by Weather Condition

Study Site: 60 and Over



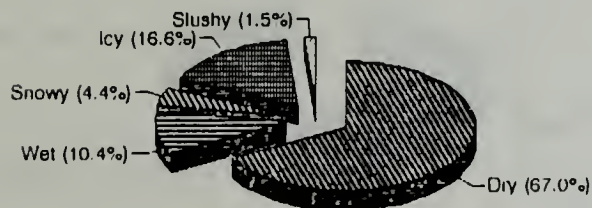
Accidents by Road Condition

Statewide-Federal Aid- All Ages



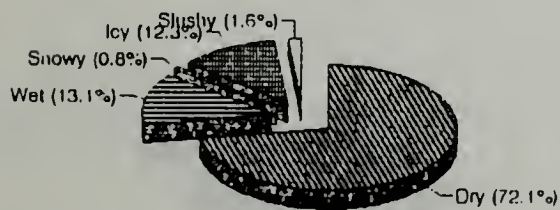
Accidents by Road Condition

Study Site: All Ages



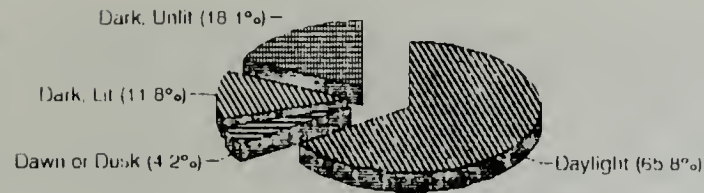
Accidents by Road Condition

Study Site: 60 and Over



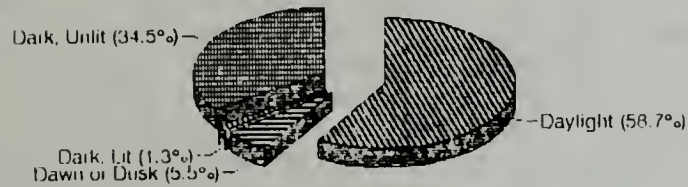
Accidents by Light Condition

Statewide-Federal Aid: All Ages



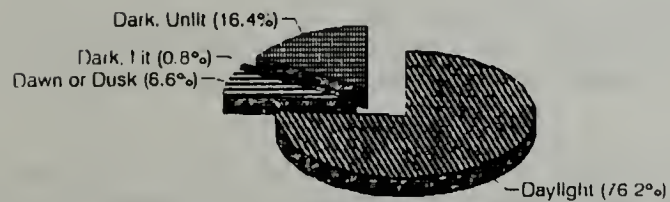
Accidents by Light Condition

Study Site: All Ages



Accidents by Light Condition

Study Site: 60 and Over



Appendix D

Elderly Problem Review

The Highway Traffic Safety Division produces and follows a plan annually. The division has focused on particular segments of our driving population. A youth demonstration project was conducted. The division worked on older driver issues. The development of a multi-disciplinary safety task force provided an opportunity to advance highway traffic safety efforts throughout the state.

1. Demographic Data

Nationally and in Montana we are aging. Our older persons increased both in total numbers and as a larger percentage of our total population. This trend will influence the way highways are designed, built and negotiated. Some design standards adopted in the 1950's and 1960's and still used today do not address adequately the needs of today's drivers, particularly those of an aging population.

The 60 year old and older age group is the fastest growing population segment. In Montana from 1970 to 1990, the 60+ age group increased by 38% compared with 13% for the rest of the population. In the next two decades, respectively, there will be an estimated 23% and a 10% increase. These increases mean an older population of drivers on our roadways. Find in the appendix further information regarding the 60 year old and older population in cities along this corridor. As can be noted, currently the communities along US 93 have very high percentages of older citizens.

Nationally, transportation studies for older drivers examined those aged 65 years old or over. At the turn of the century about four percent of our population lived to be 65 years old. In 1984 some twelve percent of our population would reach 65 years of age. High birth rates in 1945 through 1970 and improved health care and medicine are cited as accounting for the rising ages of our citizens.

Today's aging population is a mobile group. They rely on the automobile increasingly as their principal transportation mode. Over 83% of their trips are by private vehicle, about 9% by walking, and slightly more than 2% by public transit. Taxis provide 2% of trips and an "other" category summarizes the remaining 4% of trips.

Shopping and personal trips account for over 50% of most older driver's trips nationwide. Generally, older persons travel little for work related trips. Older Montanans take similar trips and are more independent and mobile than their predecessors. Driving is their main transportation choice followed far behind by walking and mass transportation.

According to research on travel, older drivers travel fewer miles in a year than other age groups. However, the frequency of their trips is comparable to young drivers. Total miles traveled by older drivers increased because they retain their driver's license longer than former generations; this increases their risks from prolonged exposure to potential accidents. Census data show many older persons residing in suburban and rural areas which makes them rely more on the automobile. Since few suburban and rural areas are adequately served by public transit, future increases in rural transit systems seem unlikely given the prospects for budget increases. Montana portrays these same national trends.

Lake County and the cities of Polson and Ronan are major communities central to the study corridor. In 1990, Polson's population aged 60 years or older was 26% compared with about 17% for the United States and Montana. Lake County in 1990, was 20% elderly compared with about 17% for the U.S. and Montana. Comparatively, there is a higher concentration of older persons in this area.

In short, we are growing older. We're no longer the young society of 1900 with only a small percentage of our population age 65 years or older. Today, twelve percent of our nation and a little more in Montana are in this age group. By the year 2020, about 25 percent of us will be over 60 years of age. Researchers estimate that 70 percent of the people over 60 and 30 percent of those over 80 now retain and use their driver licenses. These numbers will grow in the future.

2. Aging and Driving

Driving today's modern roadways requires four crucial abilities:

1. to see and hear the traffic around us;
2. to anticipate, recognize and understand situations;
3. to decide how to react in each situation; and
4. to maneuver the vehicle safely.

Older populations enjoy relatively good health. Yet, certain physical and mental deficiencies develop from aging which affect our driving capabilities. Research shows that older Americans, as a class, tend to suffer decreased capabilities in vision and hearing, cognitive skills, movement, memory and major side effects of medications.

Chronological age does not reflect personal driving skills or abilities. Aging nevertheless raises questions of how well each of us performs the four distinct driving tasks noted before.

Fortunately, many are aware of their decreased driving skills due to aging and do compensate. Most older drivers curtail night driving, avoid complex intersections, drive slower and avoid high traffic and high speed traffic areas.

National research postulates the potential deficiencies for aging drivers as:

1. **Vision** - Aging commonly produces a loss of visual acuity beginning around age 55. Our ability to see fine detail and to focus declines. Peripheral vision lessens. We require much more illumination to see clearly but our increased sensitivity to glare makes it difficult to adjust to light. Each person's illumination need doubles every 13 years due to the pupil actually shrinking.

2. **Hearing** - Hearing impairment rises dramatically with age. An inability to hear high pitched sounds is a key symptom of hearing loss. If it is difficult to hear sirens, train whistles and vehicle horns, a driver may be a greater risk. Fortunately, this impairment may not be as critical as others in performing driving tasks noted earlier.

3. **Physical** - As we age we are more limited in our mobility and agility. Decreases in the speed of our physical response due to muscular changes can be compensated for, but are compounded by problems of slower decision making. Decreased motor skills for driving performance may be compensated for in some ways. But we should remember as pedestrians, aging causes us to walk much slower than younger people; crossing streets requires more time.

4. **Mental** - Aging slows us down mentally. As we age we need more time to process road related information. We may make decisions readily but we make them less quickly than younger persons. At times aging causes us to become less attentive to driving tasks. Some drivers become forgetful and even suffer forms of dementia.

3. Accidents

Aging means we are more at risk than younger persons in all motor vehicle accidents as driver, occupant or pedestrian. More aged drivers will add to all of the older persons' accident rates. Aging is reflected in an over-representation in certain types of highway accidents.

Nationally, accident rates increase around 60 years of age and rise rapidly from age 69 years and older. The total number of crashes for the this older driving group is small. Their involvement rate in accidents is high for those aged 75 and over per groups of 1000 population. Accident involvement rates per-mile-traveled increases around 60 years of age and by age 74 and above approaches the young drivers' high involvement rate.

Drivers over age 65 were found to be over-involved in multi-vehicle accidents. They are over-involved too, in injury crashes that were caused by a failure to yield the right-of-way. Also they are over-represented in accidents involving right-left turns, backing, parking and head-on collisions.

Aging produces problems for drivers. While the chronological age of any driver does not predict specific problems in driving, aging raises the issue of when each of us must decide to give up driving as one source of our independence and mobility. Older drivers will continue to be over-represented in the previously noted accident statistics, particularly the types and frequency of accidents for miles traveled.

Appendix E

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